



**REQUEST FOR PROPOSALS  
TO PROVIDE A  
PUBLIC SAFETY RADIO SYSTEM  
FOR  
YADKIN COUNTY, N.C.**

**RFP– Yadkin Co. Radio System**

**Issued: June 14, 2013**

PROPOSALS DELIVERED TO:  
DUE: Noon, August 30, 2013

Yadkin County Manager's Office  
Yadkin County  
217 East Willow St  
PO Box 146  
Yadkinville, NC 27055  
Phone (336) 679-4200

***See full details of the required submission in this Request for Proposals***

Yadkin County, N.C. (County) requests proposals from qualified manufacturers and vendors for a replacement Public Safety Communication System. The County solicits for a narrowband analog VHF conventional simulcast radio system as outlined in this RFP. It is the intention of the County to enter into a single contract with the Selected Vendor for the entire scope of work. The RFP Schedule in Table 1 outlines the milestone dates for response and proposal deadlines. Details about these events are included in other sections of this RFP.

**Table 1 – RFP Schedule**

<b>ACTION</b>	<b>DATE (Eastern Time Zone)</b>	<b>INSTRUCTIONS</b>
Pre-Submittal Conference	Wednesday, July 3, 2013, 9:00 a.m.	The County will hold a mandatory Pre-Submittal Conference at the Yadkin County Commissioners Meeting Room at 217 East Willow Street. All interested vendors are required to have in attendance at least one representative. Vendors need to provide company name, company address, a primary contact name, contact telephone, and contact email address either by e-mail to: <a href="mailto:ahamby@yadkincountync.gov">ahamby@yadkincountync.gov</a> or call (336) 679-4200.
Site Visits	Month of July by Appointment only	Optional Sites Visits - Yadkin County will provide transportation. <b><u>RSVP the number of attendees (the number of attendees for each vendor to tour the communications center will need to be limited to 2 persons per vendor for security and to avoid federal/state criminal justice information network agreement violations)</u></b> that will join the site visit to allow transportation arrangements, by e-mail to <a href="mailto:ahamby@yadkincountync.gov">ahamby@yadkincountync.gov</a> or call (336) 679-4200.
Deadline to Submit Final RFP Questions	August 1, 2013	Submit final questions by e-mail to <a href="mailto:ahamby@yadkincountync.gov">ahamby@yadkincountync.gov</a> . The County will respond to questions prior to this date as quickly as possible and sent back to all participating firms.
Response to RFP Questions List	August 8, 2013	Consolidated list of all questions sent back to all participating Vendors by e-mail.
Proposal Delivery	August 30, 2013, by 12:00 Noon	Vendors must deliver their proposals to the <b>Yadkin County Manager's Office, 217 East Willow Street, PO BOX 146, Yadkinville, NC 27055</b> . Include a CD/DVD of all material prepared for the proposal (except pre-printed brochures and slick sheets). Vendors must submit one original and four copies of the complete proposal.
Vendor Selection	September 20, 2013.	The County will notify the Selected Vendor and all respondents.

Vendors submitting proposals in response to this RFP must have the capability of providing the products and services listed this RFP. Vendors may use joint ventures or

subcontractors, but must disclose these in the RFP response. The disclosure must include the terms and conditions of the business relationship. The County assumes no obligation of any kind for expenses incurred by any respondent to this solicitation prior to execution of an agreement. Proposals will be evaluated and ranked based on objective qualifications-based criteria, such as but not limited to, integrity, compliance with public policy, record of past performance, and financial, administrative, and technical capability to perform contract work of the size and type involved and within the time provided under the contract. The County may invite top evaluated firms for an interview so that the County can rank the most qualified firms.

All proposals become the property of the County. The County will not return any proposal or make any copies of the proposal available to anyone for any purpose other than those described in the RFP packet. Interested Vendors should refer any questions to the following County contact:

Anna Hamby  
Yadkin County  
217 East Willow St  
PO Box 146  
Yadkinville, NC 27055  
[ahamby@yadkincountync.gov](mailto:ahamby@yadkincountync.gov)

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## 1. Introduction

Yadkin County (County) currently operates a 3-site simulcast VHF analog conventional land mobile radio systems that provide voice communications for Sheriff, EMS, Rescue squad, animal control and Fire departments. Yadkin County intends to replace these systems with an analog VHF simulcast Public Safety Communications System.

The replacement system specified in this RFP will provide the County with improved simulcast communications and better coverage throughout the County. This RFP contains functional specifications for the County's anticipated new radio system.

### **1.1 *Yadkin County***<sup>1</sup>

Yadkin County consists of over 336 square miles with a population of over 38,000 residents. Yadkin County, located in the Piedmont region of northwestern North Carolina in the foothills of the Blue Ridge Mountains, was formed in 1850 from Surry County and named for the Yadkin River.

Yadkinville, the county seat, was chartered in 1857 and named after the county. Other Yadkin County communities include Arlington, Jonesville, Boonville, East Bend, Courtney, Lone Hickory, Center Brooks, Marler, Smithtown, and Forbush. Notable physical features of the county include the Yadkin River, Brushy Mountains, Fox Knob, and Cobb, Beaverdam, Fall, Lineberry, Froeman, Cranberry, and Deep creeks.

Yadkin County produces agricultural goods such as grains, tobacco, corn, soybeans, apples, livestock, and poultry. Manufactured products include textiles, hosiery, plastics and polystyrene, furniture, apparel, and stainless steel. Minerals such as feldspar, agate, jasper, limestone, mica, and iron ore are found in the county.

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<sup>1</sup> <http://ncpedia.org/geography/yadkin>; accessed May 17, 2013





Yadkin County, North Carolina

## **1.2 Mandatory Pre-Proposal Meeting**

The County will hold a mandatory pre-proposal meeting on July 3, 2013 at 9:00 a.m. At least one representative of the firm must attend in person. Others may attend via teleconference. Attendance to the meeting will serve as notice of intent to respond to the RFP. Vendors that provide on-site representation will have an opportunity to tour the County after the pre-proposal meeting by appointment only.

Interested Vendors should submit all questions about the meaning or intent of the Request for Proposal in writing to the following County contact:

Anna Hamby  
Yadkin County  
217 East Willow St  
PO Box 146  
Yadkinville, NC 27055  
[ahamby@yadkincountync.gov](mailto:ahamby@yadkincountync.gov)

The County will issue, by amendment, interpretations or clarifications the County considers necessary in response to such questions, to all parties recorded by the County as having received the RFP. The County may not consider questions received less than 10 business days prior to the Mandatory Pre-Proposal Meeting. Oral responses to any questions will not be legally binding upon the County unless documented in writing.

## **1.3 Proposal Due Date**

All responses to this Request for Proposals must be delivered no later than 12:00 Noon (Eastern Time) on August 30, 2013, to the Yadkin County Managers Office, Yadkin



County, 217 East Willow St., Yadkinville, NC 27055. Proposals NOT received by 12:00 Noon on August 30, 2013 will NOT be considered.

The County is scheduled to complete selection of a qualified vendor by September 20, 2013. All proposals shall become the property of the County. The County will not return any proposal or make any copies of the proposal available to anyone for any purpose other than those described in the RFP packet.

The County will evaluate all proposals in accordance with the criteria set forth in Section 1.5, *Significant Evaluation Factors*, and attempt to negotiate a mutually acceptable contract with the Respondent that in the view of the County proposes the best value to the County. The best value as defined by the County may not necessarily be the proposal with the lowest cost.

#### **1.4 Selection Procedures**

The County will evaluate and rank proposals based on objective qualifications-based criteria by an internal selection panel (see section 1.4 – *Significant Evaluation Factors*). The County reserves the right to request an interview with any potential Vendor during the selection process. If the County sees the need to interview a Vendor(s), the County will notify the Vendors as early as possible in the proposal review process.

The County reserves the right to reject any or all proposals based on documented reasons including determining any or all submittals to be non-responsive.

This RFP does not commit the County to enter into any agreement, to pay any costs incurred in the preparation and submittal of a proposal in response to this request, or in subsequent interviews and negotiations, or to procure a contract for the project. The County will require the Selected Vendor, if any, to participate in negotiations of the prices and fees for the system and to submit such scope, technical, and/or other revisions to the proposals as may result from negotiations.

#### **1.5 Significant Evaluation Factors**

The County will evaluate all responses to this RFP based on the Significant Evaluation Factors. Each factor has an assigned point value with a total value for all factors totaling 100. Among the factors considered in evaluating this proposal, the following are significant:

### **1.5.1 General Qualifications**

**(10 points)** The selection panel will evaluate the description of the firm and/or team of the Vendor proposing the system. The County will determine Vendor's qualifications based on the general qualifications of the company and its apparent ability to complete the project successfully.

### **1.5.2 Experience and Technical Qualifications**

**(30 points)** The County will evaluate the technical qualifications and experience of the respondents, technical staff, and subcontractors. The evaluation will include the respondents' experience, with projects of similar size and complexity. The technical qualifications should reflect demonstrated ability and past offering of public safety radio systems similar to the scope of services contained of this RFP. The County will evaluate the respondents' records of integrity, judgment, performance, and timeliness in the execution of previous contracts.

### **1.5.3 Project Approach and Proposed Solution**

**(30 points)** The County will evaluate the respondents' knowledge of the specifications presented in this RFP. The evaluation will be based on the respondents' understanding of the Scope of Services required, the specific components of the system, the specific tasks required, and the respondents' planned procedures and schedule to complete the requested work. The County will evaluate how the respondent plans to address major issues and constraints identified on this project. The County will evaluate the respondent's project management approach, including how the respondent intends to manage costs, change in scope, or quality of the design and contract documents.

### **1.5.4 Cost and Schedule Considerations**

**(30 points)** The County will evaluate the prices proposed for the system design and implementation.

## **1.6 Project Overview**

- A. The Vendor should propose a turnkey solution for engineering, furnishing, and deploying a 3-channel pair VHF analog conventional simulcast radio system.
- B. The Vendor shall be responsible for the following:
  - 1. Furnishing and installing system equipment and ancillary facilities

2. System engineering and design, including all license preparation
  3. Project management
  4. Software installation and programming
  5. User/operator and technical training
  6. Acceptance testing
  7. Coverage testing
  8. Cutover plan and execution
  9. Warranty and maintenance during warranty period
- C. The Vendor shall be responsible for furnishing a complete and fully functional system including, but not limited to the following components:
1. A narrowband analog mode simulcast replacement of current radio channels, including the guarantee to not reduce current radio coverage
  2. Site construction for any greenfield sites if needed
  3. Site modifications, if needed, for any existing sites to be used
  4. Radio dispatch console interfaces (retaining existing Orbacom consoles, if possible)
  5. Replacement of backhaul microwave network
- D. The vendor shall plan, coordinate, and conduct all work with minimal interruption of service to existing critical systems.
- E. Proposals shall completely describe the equipment and methods that the vendor will use to implement the system. The intent of this document is to allow the Vendor to propose the best equipment, technology, and methods available to provide a state of the art communications system of the highest quality and performance.
- F. All equipment provided shall be new and covered by a full manufacturer's warranty of not less than three years from system acceptance. The Vendor shall include extended warranty information and pricing for years four through six on an annual basis.
- G. The County will not accept Proposals that include systems or equipment at the end of their respective lifecycles. The County defines "end of lifecycle" products

as products for which the manufacturer intends to discontinue support within the next 7 years.

- H. In the event that requirements are stated in more than one section and appear to conflict, the more stringent requirement shall apply.

### **1.7 Provisions**

- A. Termination: The County may terminate this Request for Proposals at any time for cause.
- B. Non-Collusive Understanding: Each respondent certifies that he/she has not colluded with any other person, firm, or corporation with regard to securing the services solicited.
- C. Communications: Any notice regarding this solicitation shall be directed to the Yadkin County Purchasing Office, Yadkin County, 217 East Willow St., Yadkinville, NC 27055.
- D. Access to Records: The Yadkin County, as Owner, shall have access to books, records, and papers of the vendor and subcontractors pertinent to this contract for a period of not less than 3 years after completion of the Project.
- E. Disclosure of Interest: No elected official or employee of Yadkin County and no other public official of other jurisdictions who exercise any functions or responsibilities with respect to the project will, during his tenure or for 1 year thereafter, have any interest, direct or indirect, in the RFP or in any property included or planned to be included in the Project, or in this RFP or any other contract or proposed contract relating to this Project.
- F. Negotiation: Provisions not addressed by this solicitation will be negotiated with the Vendor once a selection has been made.
- G. Agreement: The Selected Vendor will enter into an enforceable agreement that fully conforms to the contracting provisions herein. This RFP will become part of any resulting contract.
- H. Severability: The provisions of this RFP or resulting contract are severable. Any term or condition deemed illegal or invalid shall not affect any other term or condition of any resulting contract.

- I. Relationship of Parties: The Vendor under this RFP and any resulting contract is an independent Vendor. Neither party to this contract shall be deemed the employee or agent of the other party to any resulting contract.
- J. General Indemnification: The Vendor shall defend, indemnify, and hold harmless Yadkin County from any claim, demand, suit, liability, judgment, and expense (including attorney's fees and other costs of litigation) arising out of or relating to injury, disease, or death of persons or damage to or loss of property resulting from or in connection with the negligent performance of any resulting contract by the Vendor, its agents, employees, and subcontractors or anyone for whom the Vendor may be responsible. The obligations, indemnities, and liabilities assumed by the Vendor under this paragraph shall not extend to any liability caused by the negligence of the Yadkin County or its employees. The Vendor's liability shall not be limited by any provisions or limits of insurance set forth in any resulting contract. Yadkin County shall reasonably notify the Vendor of any claim for which it may be liable under this paragraph.
- K. Indemnification - Patent and Copyright: The Vendor shall defend, indemnify, and hold harmless Yadkin County against any liability, including costs and expenses, for infringement of any patent, trademark, or copyright arising out of contract performance or use by Yadkin County of materials furnished or work performed under this RFP or resulting contract. Yadkin County shall reasonably notify the Vendor of any claim for which it may be liable under this paragraph.
- L. Subcontracts: Subcontractors or joint ventures may be used, but must be disclosed in the RFP response. Yadkin County Manager must approve any subcontractor in writing 30 days prior to the subcontractor commencing any construction, installation, or service.
- M. Compliance with Applicable Laws: The materials and services supplied under this RFP and any resulting contract shall comply with all applicable laws, and the Vendor shall maintain all applicable licenses and permits.
- N. Payments: The Vendor shall be paid as specified in any resulting contract.
- O. Advertising and Promotion of Contract: The Vendor shall not advertise or publish information for commercial benefit concerning any resulting contract without the prior written approval of Yadkin County.
- P. Property of the Yadkin County: Any materials, including reports, computer programs and other deliverables, created under any resulting contract are the

sole property of the County. The Vendor shall not use or release these materials without the prior written approval of Yadkin County.

- Q. Right of Offset: Yadkin County shall be entitled to offset against any sums due the Vendor any expenses or costs incurred by Yadkin County or penalties assessed by Yadkin County concerning the Vendor's nonconforming performance or failure to perform any resulting contract, including expenses, costs, and penalties described in Paragraph S through W of these provisions.
- R. Third Party Anti-Trust Violations: The Vendor assigns to Yadkin County any claim for overcharges resulting from antitrust violations to the extent that those violations concern materials or services supplied by third parties to the Vendor toward fulfillment any resulting contract.
- S. Cancellation for Conflict of Interest: Yadkin County may cancel this RFP and any resulting contract without penalty or further obligation if any person significantly involved in initiating, negotiating, securing, drafting, or creating the contract on behalf of Yadkin County is or becomes at any time while the contract or an extension of the contract is in effect an employee of or a vendor to any other party to this contract with respect to the subject matter of the contract. The cancellation shall be effective when the Vendor receives written notice of the cancellation unless the notice specifies a later time.
- T. Gratuities: Yadkin County may, by written notice to the Vendor, immediately terminate this RFP and any resulting contract if Yadkin County determines that employment or a gratuity was offered or made by the Vendor or a representative of the Vendor to any employee of Yadkin County for the purpose of influencing the outcome of the procurement or securing the contract, an amendment to the contract, or favorable treatment concerning the contract, including the making of any determination or decision about contract performance. Yadkin County, in addition to any other rights or remedies, shall be entitled to recover exemplary damages at three times the value of the gratuity offered by the Vendor.
- U. Suspension or Debarment: Yadkin County may terminate this RFP and any resulting contract by written notice to the Selected Vendor, if Yadkin County determines that the Selected Vendor has been debarred, suspended, or otherwise lawfully prohibited from participating in any public procurement activity.
- V. Termination for Convenience: Yadkin County reserves the right to terminate the RFP or any resulting contract in whole or in part at any time for the convenience of Yadkin County without penalty or recourse. The County shall give written



notice by certified mail, return receipt requested, to the Vendor of the termination, at least thirty (30) days before the effective date of the termination. Upon receipt of the written notice, the Vendor shall stop all work and immediately notify all subcontractors to do the same. In the event of termination under this paragraph, all documents, data, and reports prepared by the Vendor, and any equipment already delivered and paid for, under the contract shall become the property of and be delivered to Yadkin County. The Vendor shall be entitled to receive just and equitable compensation for work in progress, work completed, and materials accepted before the effective date of the termination.

W. Termination for Default:

1. In addition to the rights reserved under Paragraphs S through V of these Provisions, Yadkin County reserves the right to terminate any resulting contract in whole or in part due to the failure of the Vendor to comply with any term or condition of the contract or to make satisfactory progress in performing the contract. The County shall mail written notice of the termination and the reasons for it to the Vendor by certified mail return receipt requested.
2. Upon termination under this paragraph, all documents, data and reports prepared by the Vendor under any resulting contract shall become property of and be delivered to Yadkin County, on demand.
3. Upon termination of any resulting contract, Yadkin County may procure, on terms and in the manner that it deems appropriate, materials or services to replace those under this contract. The Vendor shall be liable to Yadkin County for any excess costs incurred by Yadkin County in re-procuring the materials or services.

- X. Nonexclusive Remedies: The rights and the remedies of Yadkin County under this RFP or any resulting contract are not exclusive.

### **1.8 Special Terms and Conditions**

- A. Time Schedule: The Selected Vendor must complete 100% of all deliverables as stated within the RFP within the negotiated time schedule.
- B. Acceptance: Determination of the acceptability of work will be made by the Yadkin County team.



- C. Insurance Requirements: The Selected Vendor shall show proof of professional liability, general liability, workers compensation, and automobile insurance as per Appendix A – *Sample Contract*.
- D. Clear Criminal Background Check: The Selected Vendor's employees, contractors or subcontractors shall be required to complete a state and national criminal history background check in compliance with the Federal Bureau of Investigations (FBI) Criminal Justice Information Services (CJIS) and NC State Bureau of Investigations (NCSBI) Division of Criminal Information (DCI) rules, regulations, guidelines and administrative codification. The criminal history check shall be completed before work begins on any portion of the system or access to any system area in which the National Crime Information Center (NCIC) or DCI data is in use or information is stored. The criminal history check must be completed on all employees, contractors or subcontractors for the project and shall be the vendor's fiscal responsibility should any financial obligation arise.



## **2. General Requirements**

### **2.1 Proposal Requirements**

- A. The County desires to work collaboratively with the Vendor to implement a narrowband analog conventional radio system that addresses the County's needs in the most cost effective manner possible.
- B. Proposal Options: Requirements described as an "OPTION" or "OPTIONAL" refer to features or equipment the County may or may not purchase, or items whose quantities are not yet determined. It is not the Vendor's option to respond to these requirements; therefore, the Vendor is required to respond to all OPTIONAL requirements to the greatest extent possible.
- C. Alternate Proposals:
  - 1. In the event the Vendor has a technological solution that does not meet the exact requirements in this specification, the Vendor may offer more than one proposal as long as each proposal fully and independently addresses the intent of the requirements set forth in this specification.
  - 2. Alternate proposals shall be submitted separately under a different cover from the base proposal and clearly marked "ALTERNATIVE PROPOSAL."
- D. All project submittals shall be subject to review and approval by the County and its Engineering Lead / Consultant.
- E. The Vendor shall provide all submittals in hard copy, properly bound, and in their native electronic format on CD-ROM or DVD disks. One or more disks shall accompany each hard copy submittal.
- F. All submittals shall include a cover letter or letter of transmittal, signed, dated, and fully describing the contents of the submittal.

#### **2.1.1 Proposal Content**

The Vendor shall provide hard copies of the proposal, properly bound, and the files comprising the proposal in their native electronic format on CD-ROM or DVD. One or more disks shall accompany each hard copy submittal. The Proposal shall include the following items:

- A. Detailed descriptions of the proposed systems and services to be provided

- B. Preliminary detailed project schedule
- C. System design including complete description, block diagrams, equipment layouts, and equipment list
- D. RF coverage predictions and guarantee of coverage
- E. Detailed equipment specification sheets for all proposed equipment
- F. System, subsystem, firmware, and software warranty information
- G. Training programs
- H. Itemized pricing information, including per-item and per-site costs for all significant hardware, firmware and software components and all required feature options, including any software or feature licensing
- I. Software/Firmware support and upgrade program pricing information, detailed by equipment, feature, and subsystem level – If annual, pricing must be included for years 1 through 5, 5 to 10, and 10 to 15
- J. Coverage and Final Acceptance Test Plans

### **2.1.2 Submission of Proposals**

- A. Please submit one original and four copies, and five CD/DVDs having all files, of your proposal in a sealed envelope or package marked with the RFP number, to be received by the County no later than 12:00 Noon (Eastern time) on August 30, 2013, to the attention of:  
  
Aaron Church, County Manager  
Yadkin County  
217 East Willow St  
PO Box 146  
Yadkinville, NC 27055  
Phone (336) 679-4200  
[achurch@yadkincountync.gov](mailto:achurch@yadkincountync.gov)
- B. Please submit an electronic copy of the proposal documents prepared for this proposal on CD/DVD with each printed proposal. Brochures, specification sheets, and other “slick” sheets need not be included electronically.
- C. In the interest of fairness, and to allow for the County’s timely review, the County will not consider proposals received after the scheduled receipt time stated

above and shall mark them as “non-responsive”. All proposals received become the property of the County and will not be returned.

### **2.1.3 Project Management**

- A. The Vendor shall provide a Project Management Plan that includes, a detailed Work Breakdown Structure (WBS), project scope, deliverables, schedule, QA/QC processes, and risk management sections.
- B. The Plan shall describe how the Vendor intends to monitor and control the installation and deployment of the proposed system and mitigate risks in order to ensure the system meets the design specifications and meets it on schedule.
- C. The Vendor shall establish regularly scheduled status meetings with the County Project Team and provide a schedule for these meetings subject to the approval of the County.

### **2.1.4 Project Schedule**

- A. The Vendor shall develop and maintain a project schedule including tasks, milestones, start and end dates, task prerequisites, and task owners based on an approved WBS.
- B. The schedule shall represent tasks associated with completing work on all items identified in the WBS. The Vendor shall update the project schedule with actual dates as tasks are completed.
- C. The Vendor shall provide the updated schedule as an agenda item for all weekly status meetings between the County and the Vendor.
- D. The schedule shall address the following at a minimum:
  - 1. Site surveys
  - 2. Detailed design review
  - 3. Site preparation
  - 4. Equipment manufacturing
  - 5. Factory acceptance test
  - 6. Equipment delivery
  - 7. System installation

8. System configuration
9. System optimization
10. Field acceptance testing (conditional and final)
11. Limited coverage testing
12. User training
13. System cutover
14. System documentation development and delivery
15. System and equipment warranty
16. A system back out plan (SBOP) should any portion of the system fail during transition to restore previous levels of operation to the system.

## **2.2 Project Coordination**

### **2.2.1 Project Meetings**

- A. The Vendor shall schedule a project kickoff meeting prior to the beginning of the project.
- B. The Vendor shall schedule weekly project status meetings following contract award and the initial kickoff meeting.
- C. The Vendor shall be responsible for scheduling the meetings as well as preparing meeting agendas and minutes. In addition to those identified in Section 2.1.4, *Schedule*, meeting agenda items shall include, as a minimum, the following items:
  1. Schedule review
  2. Status of deliverables
  3. Risk items
  4. Changes
  5. Plans for the next period
  6. Action item assignments
  7. Punch list review

### 2.2.2 Project Staffing

- A. The Vendor shall manage project staffing based on workload and the level of effort throughout the implementation / installation process; however, the Vendor shall staff the positions of Project Manager and Project Engineer throughout the duration of the project and shall not change these staff positions without prior approval by the County.
  - 1. The County reserves the right to approve the Vendor's proposed Project Manager and/or the Project Engineer.
  - 2. The County reserves the right to request the replacement of the Project Manager and/or the Project Engineer at any time without disclosing a specific cause.
- B. Vendor's Project Manager:
  - 1. The Vendor's Project Manager shall be the primary point of contact between the County and the Vendor.
  - 2. The Vendor's Project Manager shall bear full responsibility for supervising and coordinating the installation and deployment of the communications system; be responsible for development and acceptance of the Project Management Plan; managing the execution of the project against that plan; and overseeing the day-to-day project activities, deliverables, and milestone completion.
  - 3. The Vendor's Project Manager shall be responsible for coordination of the weekly status meetings.
- C. Vendor's Project Engineer:
  - 1. The Vendor's Project Engineer shall have the primary responsibility for managing the system design and ensuring completion of the system installation in accordance with the approved system design.
  - 2. Any deviation from the system design shall be subject to project change control procedures and shall not be undertaken until approved by the County.
  - 3. The Vendor's Project Engineer shall ensure the development of block diagrams, system level diagrams, demarcation interface diagrams, rack diagrams, and bill of materials, to assist the installation team in completing the system installation. The Vendor shall provide final design and "As-built"

documentation in the native electronic form, AutoCAD® and Adobe Portable Document Format (PDF), as well as five bound hard copy sets.

4. The Vendor's Project Manager and Engineer shall also supervise the development and execution of Acceptance Test Plans (Factory and Field), the Coverage Acceptance Test Plan, and guide the project team through the processes and procedures necessary to prove that the system performs as specified in the contract. The Vendor shall not execute any test plan until approved by the County.

### **2.2.3 Frequency Coordination and Licensing**

- A. The Vendor shall use the current VHF and microwave frequencies to fulfill the proposed system design based on the performance requirements and in accordance with FCC Part 90 and 101 rules and regulations.
- B. The Selected Vendor shall be responsible for all frequency research, frequency coordination, and preparation of all associated and/or newly required FCC license applications and submittals on behalf of the County.
- C. Following approval of the design phase, the Vendor shall provide all modifications and applicable forms to the County for review and approval. The Vendor shall also be responsible for any additional frequency research, support, and preparation if necessary. The County shall execute and submit all forms following approval.
- D. The County shall be responsible for coordination and licensing fees, if applicable.
- E. The Vendor shall complete FAA forms as necessary.

### **2.2.4 Preliminary Design**

The Vendor shall submit a Preliminary Design Document within 30 calendar days of contract award. The Preliminary Design Document shall include the following:

- A. QA/QC Plan
- B. Detailed project schedule
- C. System block diagrams
- D. System description including subsystems

- E. Radio channel plans
- F. Detailed bill of materials for the system, by subsystem and by site, including all hardware, firmware, software and options
- G. Draft copies of acceptance test plans
- H. Roles and responsibilities for the Vendor and the County during all levels of the implementation plan

### **2.2.5 Final Design**

The Vendor shall submit the Final Detailed Design Document within 60 calendar days of contract award. The Final Detailed Design Document shall include the following:

- A. Any updates to previously submitted design information
- B. System operation and maintenance manuals for all equipment
- C. Site installation drawing
- D. All acceptance test plans as defined in this specification
- E. Detailed equipment list for the system, by subsystem and by site, including all hardware, firmware, software and options
- F. Detailed description of system operation
- G. Detailed description of system operation during various failure scenarios
- H. Detailed description of all subsystems
- I. Final project schedule
- J. List of roles and responsibilities for the Vendor and the County during all levels of the implementation plan

## **2.3 Quality Assurance**

### **2.3.1 Standards and Guidelines**

- A. The Vendor shall comply with the applicable positions of the following standards, rules, regulations, and industry guidelines, presented here alphabetically with no priority implied:

1. American National Standards Institute (ANSI)
  2. American Society of Testing Materials (ASTM)
  3. Electronics Industry Association (EIA)
  4. Federal Communications Commission (FCC)
  5. Institute of Electrical and Electronics Engineers (IEEE)
  6. National Electrical Code (NEC)
  7. National Electrical Manufacturer's Association (NEMA)
  8. National Fire Protection Association (NFPA) 1221
  9. Telecommunications Distribution Methods Manual (TDMM)
  10. Telecommunications Industry Association (TIA)
  11. Underwriters Laboratories, Inc. (UL)
- B. The Vendor shall comply with industry best practices for system installation, grounding, bonding, and transient voltage surge suppression (TVSS). Either of the following standards are acceptable:
1. Motorola R56 – Standards and Guidelines for Communication Sites (latest revision)
  2. Harris Site Grounding and Lightning Protection Guidelines (AE/LZT – 123 4618/1 – latest revision)
- Should the Vendor choose another industry standard – Vendor shall provide an electronic copy of the standard to the County for review with their proposal.
- C. Governing codes and conflicts: If the requirements of this specification conflict with those of the governing codes and regulations, then the more stringent of the two shall become applicable.
- D. If the Vendor cannot meet any of the standards or guidelines listed above, the Vendor shall list any deviations for approval by the County in their proposal.



### **2.3.2 Quality Assurance / Quality Control Program**

- A. The Vendor shall include a Quality Assurance / Quality Control (QA/QC) plan for the radio communications system project. The Vendor shall submit the QA/QC plan for review during preliminary design. The plan shall address all stages of the project, including, but not limited to:
  - 1. System design
  - 2. Staging – The Selected Vendor shall submit the factory acceptance test plan to the County for review and approval no less than ten days prior to the start of factory testing. The County at its discretion may request up to eight representatives to witness the system integration and testing of the equipment at the Selected Vendor's facility.
  - 3. Inventory management
  - 4. Installation
  - 5. Implementation
  - 6. Testing
  - 7. Cutover
  - 8. Warranty service
- B. The QA/QC plan shall specifically describe the plans and procedures that ensure the proposed system design complies with the standards and requirements described in this specification.
- C. The Project Management Plan developed by the Project Manager shall include the QA/QC plan.
- D. The QA/QC plan shall be an integral part of the project and include the County personnel as part of the review and approval process for all deliverables and submittals.
- E. The proposed QA/QC plan shall address the following project tasks at a minimum:
  - 1. Design analysis and verification
  - 2. RF coverage analysis and verification
  - 3. Design changes and document control
  - 4. Material shipping, receiving, and storage

5. Site preparation (if required)
6. Field installation and inspection

### **2.3.3 Project Punch List**

- A. The Vendor shall establish and maintain a punch list, as mutually agreed to with the County, for site facilities, equipment, and for acceptance tests.
- B. The punch list shall be maintained in real time and include the following at a minimum:
  1. Sequential punch list item number
  2. Date identified
  3. Item description
  4. The party responsible for resolution
  5. Expected resolution date
  6. Resolution date
  7. Full details about how each punch list item was resolved and tested
  8. Notes about the item
- C. If the Vendor transfers responsibility for resolving an item to another person or group, the Vendor shall add a new entry to the punch list and appropriately note the original entry.
- D. The Vendor shall be responsible for reviewing each punch list item, and advising the County of any changes. The Vendor shall update the status of punch list items during each weekly status meeting.
- E. Software/Firmware updates must be thoroughly regression tested prior to release and implementation.
- F. Software/Firmware updates must include release information identifying the changes made, either to repair a problem or enhancements made.
- G. All Software/Firmware for like units shall be the same revision.
- H. All Software/Firmware shall be brought up to the then current version prior to system acceptance.

1. Equipment inventory and tracking
2. System testing and validation
3. Software regression testing
4. Deficiency reporting and correction
5. Implementation and cutover
6. Training and certification

### 3. System Requirements

The new radio system will be a three channel-pair conventional, simulcast analog system operating on the current VHF public safety channels. The repeaters shall be located to provide the coverage guarantee. Microwave links will interconnect the repeater sites. One channel will be used for fire paging in addition to voice. Appendix B – *Yadkin County, NC, Licensed Frequencies* provides a list of the County's currently licensed frequencies.

The conventional radio system shall support voice communications between fixed locations, control centers, offices, and the work force in the field who use mobile and portable radios. The following subsections describe the County's requirements.

#### 3.1 Functional Requirements

- A. The proposed system shall include the following functional system components:
  - 1. Narrowband analog VHF conventional radio infrastructure:
    - a. System control equipment, as necessary
    - b. Remote simulcast sites
  - 2. Microwave radio links interconnecting the sites as needed.
- B. All site equipment supplied by the Vendor shall be new, of high quality, and designed to provide high reliability to support critical infrastructure and mission critical communications. The site equipment, or RF infrastructure, shall consist of the following components:
  - 1. System and site control equipment
  - 2. Simulcast equipment
  - 3. Receiver voting
  - 4. Repeater Stations
  - 5. Combiners / multicouplers / duplexers
  - 6. Antenna Systems
  - 7. Backhaul network equipment

C. Simulcast equipment:

1. The Vendor shall provide all necessary simulcast components and signal processing elements required to optimize voice quality in coverage overlap areas.
2. Non-captured overlap areas with delay spreads in excess of those required to meet the Delivered Audio Quality (DAQ) objective shall be minimized inside the service area.
3. Simulcast systems shall operate without the need for frequent manual optimization and system/subsystem alignment. All alignment and adjustments shall be automated where possible (e.g., signal conditioning adjustments for channel banks, signal launch times at sites, etc.).
4. Simulcast systems shall operate as a stand-alone subsystem in the event of failure of, or lost connectivity to, the network core. The Vendor shall describe operations of the simulcast systems under these conditions.

D. Receiver voting:

1. Receiver voting equipment shall monitor all receivers in the simulcast subsystem and select the best signal or develop a composite signal for processing and rebroadcast through the network.
2. Receiver voting equipment shall be capable of operation in the event of failure of, or lost connectivity to, the network core. The Vendor shall describe operations of the receiver voting system under these conditions.

E. Antenna systems:

1. The Vendor shall propose all antenna system equipment necessary for a complete design. Antenna system equipment shall include tower frames and/or antenna mounts as necessary.
2. Antennas shall be appropriate to provide the required coverage, match the antenna design used for all coverage modeling, and meet applicable FCC rules and regulations.
3. Transmission line type and length shall be appropriate to provide the required coverage.
4. The Vendor shall fully describe expansion capacity for combiner and multicoupler systems to allow for additional channels in future upgrades.

5. The Vendor shall include detailed specification sheets for all proposed equipment, including, but not limited to antennas, receiver multicouplers, transmitter combiners, and tower top receiver pre-amplifiers (if applicable).

### **3.2 Operational Requirements**

This section details the technical aspects and minimum operational requirements for the Vendor's proposed radio system.

#### **3.2.1 Analog Conventional**

- A. The Vendor shall provide a narrowband analog system using 12.5 kHz channels for voice communications.

### **3.3 Performance Requirements**

This section lists the minimum performance requirements for the Vendor's proposed radio system.

#### **3.3.1 Coverage**

- A. The service area is the area within the geographical boundaries of the County.
- B. The system shall provide coverage at least equal to the current coverage of the system.
- C. System coverage testing will be done using DAQ 3.4 values.
- D. DAQ as defined in this document applies to both inbound and outbound communications. Table 2 contains a matrix of DAQ values and definitions.

**Table 2 – DAQ Values and Definitions**

DAQ	SUBJECTIVE PERFORMANCE DESCRIPTION
1	Unusable, Speech Present, but unreadable
2	Understandable with considerable effort. Frequent repetition due to noise/distortion
3	Speech understandable with slight effort. Occasional repetition required due to noise/distortion
3.4	Speech understandable with repetition only rarely required. Some noise/distortion
4	Speech easily understood. Occasional noise/distortion
4.5	Speech easily understood. Infrequent noise/distortion
5	Speech easily understood

- E. Coverage design, implementation, and testing for the system shall adhere to the Telecommunications Industry Association (TIA), Telecommunications System Bulletin (TSB) 88C, or the latest revision at time of proposal.

### 3.3.2 Redundancy

- A. The proposed radio system shall support mission critical operations; therefore, requiring a high degree of redundancy and survivability. A network topology utilizing fault tolerance shall be incorporated to the greatest extent possible through a distributed and/or redundant architecture.
- B. The system design shall have no single point of failure; requiring redundancy for those elements that would result in a major system failure. Such elements include, but are not limited to the following:
1. Simulcast common equipment
  2. Power system design

### 3.3.3 Site Locations

- A. The Vendor shall select a location for the simulcast control. The Vendor shall select sites that support the desired coverage and the least simulcast time delay interference.
- B. The County prefers the use of existing County sites. Table 3 shows the sites in use today:

**Table 3 – Current Site Data**

Site Name	Address	Latitude	Longitude	Tower Type	Height (ft)
East Bend	E. Main Street	36.214194	-80.504091	Water Tower	145
Yadkinville	109 E. Cherry St	36.13601	-80.667245	Water Tower	153
Jonesville	2744 Woodland Trl	36.192774	-80.820248	Self-supporting tower	120

- C. The Vendor shall provide coverage maps showing the level of coverage they are willing to guarantee from the simulcast sites.
- D. In the event the Vendor feels that the existing locations are insufficient to deliver the necessary coverage, the Vendor may suggest modifications to the existing sites and/or alternate sites. If the Vendor suggests alternate sites, the Vendor shall also provide coverage maps with the alternate sites showing the level of coverage they are willing to guarantee.

### **3.3.4 Site Equipment**

- A. Equipment supplied for the new radio system will be installed in existing County facilities if possible.

### **3.3.5 System and Site Control Equipment**

- A. The system and site control equipment shall be fault tolerant and capable of controlling all voice and data channels in the proposed system. The control equipment may use a distributed or centralized architecture.
- B. Routers, switches, and servers should consist of “Commercial Off-The-Shelf” (COTS) components. The Vendor shall provide any operating systems or configuration files required for the operation of these COTS components. Software/firmware maintenance and upgrade requirements for COTS equipment shall be considered the same as manufacturer supplied and OEM equipment defined in this document.

### **3.3.6 Fixed Transmitter / Receiver Equipment**

- A. General:
  - 1. Repeaters and/or base station equipment shall be solid state in design and function with standard site conditions for temperature, elevation, and humidity.



2. Equipment shall have monitor/alarm interfaces to provide status to the Vendor's Network Management System. Simple Network Management Protocol (SNMP) version 3.0 is the communications protocol of choice for the Network Management System.
  3. The units shall be as compact as possible, with mounting configurations for standard Electronics Industry Alliance (EIA) relay rack or optional lockable cabinets.
  4. The units shall consist of modular components or Field Replaceable Units (FRU) allowing for in the field repairs whenever possible.
- B. Repeaters and/or base station equipment shall comply with Part 90 and Part 15 of the FCC Rules and Regulations, as well as appropriate TIA/EIA and similar agency standards and be FCC type accepted for the VHF frequency band.
- C. Prior to implementation, the Vendor shall perform the following studies at each site:
1. Intermodulation analysis – The Vendor shall consider transmitting equipment from all tenants located at the proposed sites, per FCC licensed information and information from County staff.
  2. Maximum Permissible Exposure (MPE) study (per latest revision of OET Bulletin 65) – The Vendor shall consider transmitting equipment from all tenants located at the proposed sites, per FCC licensed information.
- D. The Vendor shall resolve all issues predicted during the intermodulation analysis and MPE studies. If the Successful Vendor identifies an intermodulation problem following implementation, the Vendor shall resolve the issue without degrading system coverage or performance for a period of up to 12 months after final acceptance, at no cost to the County. If MPE standards are exceeded at any site, the Vendor shall recommend and assist the County in mitigating the problem through signage, fencing, and other protection means.
- E. The Vendor shall include detailed specification sheets for all proposed equipment.

### **3.4 Coverage Maps Criteria**

- A. The Vendor shall include a detailed description of the propagation models used and the assumptions made in preparation of the coverage maps. A brief

description of the methodology the software used to calculate coverage shall also be included in the proposal narrative.

- B. The Vendor shall submit both talk-out and talk-in system composite coverage map sets for proposed voice configurations (simulcast system and out of area system). Coverage map sets shall provide sufficient specific predicted coverage detail in any given area.
- C. The Vendor shall produce maps which are clearly labeled and show system gain calculations for each of the following:
  - 1. Mobile radios – Standard 35 watt dash mount with a 3 dB gain mobile antenna mounted in the center of the roof
  - 2. Portable radios – Standard 5 watt portable radio outdoors:
    - a. Talk-out to a portable radio on hip with swivel belt clip
    - b. Talk-in from a portable radio at head level
- D. The Vendor shall provide link budgets, clearly defining the following minimum information, relating to each map and each site:
  - 1. Base station / repeater RF power output
  - 2. Antenna gain
  - 3. Antenna down tilt (if applicable)
  - 4. Transmit ERP
  - 5. Receiver effective sensitivity
  - 6. Antenna height
  - 7. Mobile and portable antenna height for talk-out and talk-in
  - 8. Mobile and portable RF output power
- E. Maps shall depict coverage using a light transparent color or cross-hatching for those areas that meet or exceed the minimum coverage reliability threshold.
- F. All maps must clearly delineate the difference between areas predicted to be greater than DAQ 3.4 equivalent coverage and areas that do not meet coverage requirements. The Vendor shall include the effects of simulcast interference in all coverage maps where applicable.

- G. All coverage modeling shall use parameters representative of the proposed system and equipment
- H. Vendors shall provide coverage maps in the proposal in two formats:
  - 1. 11"x17" (minimum) full color hardcopy format
  - 2. In PDF file format on CD-ROM
- I. All maps shall include a background layer that includes identifiable geographical features allowing for familiar points of reference. These features should include:
  - 1. Major streets, roads, highways, and freeways
  - 2. County and city boundaries
  - 3. Rivers
  - 4. Prominent mountains

### **3.5 Microwave Backhaul Network**

- A. The County requires a new backhaul network connecting all the sites using a licensed microwave radio system. The microwave system shall be capable of supporting IP connectivity and configured with redundant loop protection and a hot standby radio at each site.
- B. Feasibility studies should be conducted and used for baseline equipment and radio frequency system design. Preliminary feasibility studies shall be prepared using information included in this RFP and obtained during the site visits.

Proposers shall include a preliminary path design in the proposal.

- C. Formal microwave path surveys shall be conducted to determine or verify site coordinates, ground elevation, on-path obstructions (location and height), tower information, and other parameters required to engineer the final design of a radio link. The present and anticipated future effect of on-path obstructions shall be evaluated and incorporated into the path design where applicable.
- D. Vendor shall recommend the type of antenna, antenna size, and mounting height for approval by the County. All microwave dishes shall be covered by radome matching the surrounding aesthetics.
- E. Selected Vendor shall be responsible for procuring the necessary equipment to meet project milestones and complete the project.

- F. Selected Vendor shall install equipment for alarm and network management.
- G. The Selected Vendor may utilize the company of its choice for frequency coordination and protection. Frequency planning services by the Selected Vendor shall include frequency selection, frequency protection (for one year), prior coordination, interference case resolution, and FCC license application documentation preparation. The Selected Vendor shall conduct interference studies utilizing industry-accepted methods, hardware, and software to build a database that is as accurate as possible at the time of the study. The Selected Vendor shall pay for all costs related to these activities.
- H. Selected Proposer shall prepare final path design services based on formal path survey data gathered. The County will approve the final project path design after which the project can move to the implementation stage.
- I. General Specifications:
  - 1. Digital microwave transmission equipment must be compliant with the Federal Communications Commission (FCC) Rules and Regulations.
  - 2. Equipment must operate using frequencies authorized in the Terrestrial Microwave Fixed Radio Services 6, 11, 18 and 23 GHz as prescribed under (Part 101 of the Code of Federal Regulation, Title 47).
  - 3. Digital microwave transmission system must have capacities of 150 Mb/s with multiple T1 and Ethernet interfaces, for operation in the 6, 11, 18, and 23 GHz frequency bands.
  - 4. All active radio equipment must be mounted indoors. Outdoor/tower-mounted radio transceivers "ODU" are not acceptable.
  - 5. Radio equipment must be designed for a minimum service life of fifteen (15) years.
  - 6. The proposed links must support and withstand future voice, data, and video communications for public safety and other Yadkin County uses.

## 4. Infrastructure Development

The County wishes to reuse any portion of the system infrastructure that is reusable; however, the County understands that some site or infrastructure modifications or upgrades may be necessary to support a robust, reliable system. The following subsections provide minimum standards that Vendors should adhere to in the event they determine sites or infrastructure subsystems require modifications.

### 4.1 General

- A. The Vendor shall use existing infrastructure to the greatest extent possible.
- B. The Vendor shall perform due diligence in verifying all proposed site data for inclusion in the proposed radio system.
- C. The Vendor shall identify and propose any additional work necessary, including, but not limited to:
  - 1. Shelters
  - 2. Towers
  - 3. Backup power
- D. During preliminary design, the Vendor shall provide detailed drawings including all structures and foundations, sealed by a professional engineer registered in the state of North Carolina.
  - 1. Detailed dimensioned drawings showing all system components and locations
  - 2. Drawings and/or specifications shall describe any auxiliary equipment
  - 3. The Vendor shall provide manufacturer slick sheets of all equipment used
- E. Code Compliance:
  - 1. Installation of all electrical equipment, power distribution, lighting, assemblies, and associated wiring shall comply with the National Electric Code (NEC) and Occupational Safety and Health Administration (OSHA) regulations.
  - 2. All electrical equipment shall be listed or approved by Underwriters Laboratories (UL).

3. The Vendor and any contractor employed by the Vendor shall comply with all applicable local codes and industry best practices.
- F. The Vendor shall assume total responsibility for maintaining liability insurance covering the following items:
1. Project design
  2. Implementation
  3. Licenses
  4. Shipping
  5. Receiving
  6. All site work required
  7. Any items required for the Vendor or any required sub-vendors or subcontractors.
- G. Prior to any excavations, the Vendor or subcontractor shall follow appropriate procedures outlined at Yadkin County Central Permitting website: <http://www.yadkincountync.gov/index.aspx?NID=134>
- H. The Vendor will coordinate with utility companies for all utility related items, such as electrical service hookups and disconnects.
- I. Concrete:
1. For all foundations and concrete work, the Selected Vendor or subcontractor will provide to the Project Engineer a test sample of each mix of concrete demonstrating that it has been tested for compliance with the foundation specifications set forth by the requisite site engineer. Written reports certifying the strength of the concrete are to accompany each test cylinder.
  2. If any concrete used in the foundation does not meet specifications, the Vendor or subcontractor will be required to remove the foundation and pour a new foundation using compliant materials, at no expense to the owner.
- J. All control functions and alarms from towers, shelters, and backup power shall be interfaced to the Network Management System for remote control and monitoring.

## 4.2 Shelters

### A. General:

1. The Vendor shall propose a new equipment shelter at new site locations and when existing shelters are deemed inadequate to accommodate the proposed new equipment.
2. The shelter shall be a prefabricated, preassembled shelter. The shelter may be constructed from concrete, fiberglass, and/or aggregate materials.

### B. Size:

1. Shelter dimensions shall be determined by the Vendor dependent upon final design. Legacy and proposed systems shall use up to 60% of the floor space, leaving a minimum on 40% for future expansion.
2. Minimum shelter size shall be 12' x 30', with a minimum interior height of 9 feet.

### C. Foundation:

1. The equipment shelter foundations shall consist of an elevated concrete slab a minimum of 12-inches above ground level to prevent possible ground water intrusion into the equipment shelter. A 48"x 48" concrete entrance pad shall be included in the foundation design to serve each entry door and shall be a continuous pour with the main foundation.
2. The Selected Vendor shall provide equipment shelter foundation designs and build-to (installation) drawings.
3. The Selected Vendor shall employ a Professional Engineer (PE) licensed in the State of North Carolina to prepare the equipment shelter foundation designs, build-to (installation), and equipment shelter design drawings. The designs shall meet or exceed manufacturer's specifications.
4. The Selected Vendor shall provide all required hardware to attach each equipment shelter to its foundation.

### D. Flooring:

1. The Selected Vendor shall propose a structure with floor and/or solid foundation featuring a minimum uniform load rating of 300 pounds per square foot with no more than 3,000 pounds over any four-square-foot area.

This rating shall be increased in sections as necessary to support heavy weight equipment. If delivered assembled with floor, the floor shall exhibit a minimum 90 pounds per square foot uniform live load capacity while the building is being lifted.

2. Base moldings shall be installed around all of the equipment shelter perimeter walls.
3. Exterior covering of the floor shall be included to prevent rodent penetration.
4. The floor shall be covered by a high quality, industrial / commercial grade asphalt, or vinyl tile. All edges shall be covered by wall molding.
5. The flooring shall be grounded to the equipment shelter's electrical grounding system.

E. Walls:

1. Walls shall be constructed to a minimum 120 MPH wind loading.
2. Walls shall withstand the effects of bullets or other projectiles equivalent to a 30.06 high power rifle load fired from a distance of 50 feet with no penetration to the inner cavity of the wall. No interior damage shall be sustained including insulation, interior walls, etc.
3. The outside walls shall be finished concrete or an aggregate composition.
4. A wall feed-through panel with 12 ports and 4-inch openings shall be provided on the tower side of the building to accommodate coaxial transmission lines between 1/2-inch and 1 5/8-inch diameter elliptical waveguides. All conduits shall be sealed into the wall to assure that they are watertight.
5. The inside walls shall be finished with minimum 5/8-inch plywood (or equivalent) trimmed with coordinated molding to allow mounting of panels, blocks, etc.
6. High performance insulation shall provide a minimum insulation factor of R-11.

F. Roof:

1. Roof insulation shall be R-19 or greater.
2. The roof design shall prevent the accumulation of water.
3. The roof shall meet 150 pounds-per-square-foot (PSF) capacity rating.



4. High performance insulation shall provide a minimum insulation factor of R-19 or greater.

G. Door:

1. Shelters shall have one 42" x 84" insulated door, with three stainless steel tamperproof hinges, passage style lever handle, deadbolt lockset and fiberglass weather hood or awning. The door shall be equipped with a hydraulic door closer.
2. The exterior door shall be of aluminum or steel (stainless or galvanized) construction with a finish to match the building finish.
3. The door shall withstand the effects of bullets or other projectiles equivalent to a 30.06 high power rifle load fired from a distance of 50 feet with no penetration to the inner cavity of the door. No interior damage shall be sustained including insulation, interior walls, etc.
4. The doorsill shall be of stepped construction to prevent rainwater from entering the shelter at the bottom of the door or from around the doorframe. The doorframe shall have a weather seal around the door to limit air and water intrusion.

H. Finishing:

1. The interior and exterior finishes shall be described by the Vendor. Color and finishes shall be selected by the County from samples provided by the Vendor or subcontractor.
2. All joints shall be sealed with a compressible, resilient sealant.

I. AC Power System:

1. The Vendor shall deliver the building complete with a 200-ampere capacity, 120/240 volts, single-phase electrical panel box with a ground bar.
2. This panel shall be equipped with a 200-ampere capacity main circuit breaker used to supply power for all electrical functions related to the site.
3. Overall panel size shall be determined by the need to provide the number of individual breakers required plus a reserve of at least six 240 Volt slots or 20% of total slots, whichever is greater.
4. Breakers for shelter air conditioning will be of the bolt-down, not snap-in, type.

5. Receptacles:

- a. Each radio equipment unit (or rack) shall be supplied with two 20 Amp circuits, each terminated at a typical National Electrical Manufacturer's Association (NEMA) 5-20 receptacle. Receptacles shall be mounted to the side of the overhead cable tray.
- b. Service receptacles shall be mounted on the walls at 6 ft. intervals or less.
- c. One weatherproof ground fault circuit interrupter (GFCI) exterior power receptacle shall be provided with each shelter, to be mounted near air conditioning units.
- d. Each receptacle shall be fed from an individual breaker. The feeding breaker shall be identified at the receptacle and the receptacle shall be identified at the breaker. All breakers or circuits shall be 20 Amp, unless otherwise noted.

J. Power Line Surge Suppression:

1. An AC surge protector shall be provided and installed inside the shelter.
2. An acceptable unit shall be an in-line type such as the AC Data Systems "integrated load center." An alternate unit must meet or exceed all of the capabilities of this model unit.
3. Minimum surge protector requirements:
  - a. Built-in redundancy of dual stages per phase with filtering
  - b. Surge energy shunted to ground, not to neutral
  - c. Front panel indicator lamps
  - d. Remote / local status contacts
  - e. Fusible link protected so as not to interrupt power
  - f. Field replacement protection blocks, fuses, if needed
  - g. UL listed components
  - h. 45 kA per phase ANSI C62.1 8/20 waveform
  - i. EMI/RFI filtering per Mil-STD-220
4. The unit shall be capable of handling the full 240 Volt, 200 Amp capacity of the electrical system.

K. Wiring Methods:

1. All wiring noted on the site drawings or otherwise included by the Vendor shall be installed in conduit or ductwork. Where no protection method is specified, conduit shall be used.
2. All conduits and ducts shall be securely surface mounted and supported by approved clamps, brackets, or straps as applicable and held in place with properly selected screws. No wiring shall be imbedded inside any walls, floor or ceiling. Entrance power, outside lighting, air conditioning outlet, and Telco are the only wiring that may penetrate shelter walls or floor.
3. All wire raceway, conduit, etc., is to be mechanically joined and secured.
4. Flexible steel conduit or armored cable shall protect wiring connected to motors, fans, etc., and other short runs where rigid conduit is not practical.
5. Unless otherwise specified, all power wiring shall be a minimum 12 AWG (American Wire Gauge) size solid copper conductors with insulation rated for 600 Volts alternating current (AC).

L. Light Fixtures:

1. Equipment shelter lighting shall be energy efficient and generate low heat levels. Technologies such as light emitting diodes (LED) or fluorescent shall be employed.
2. Equipment shelter lighting shall comply with the U.S. defense standard MIL-STD-461E for low radio frequency interference (RFI) lighting fixtures.
3. There shall be sufficient interior lighting to provide a level of 540 Lux (50-foot candles at 1 meter (39.4 inches) above the equipment shelter floor. Refer to TIA/EIA-569-B standard for additional information.
4. Placement of equipment shelter lighting shall assure illumination in front of and behind tall equipment racks (within aisle ways; not directly above equipment racks).
5. Interior lighting control switches shall be located near the non-hinged side of the equipment shelter entrance door. One switch shall control a single lighting fixture and the second switch shall control the remaining lighting fixtures. Refer to NFPA, NEC 70-2011 (or latest edition) Article 410 – Luminaries, Lamp Holders, and Lamps for additional information.
6. Interior emergency backup lighting units shall be installed and activate immediately upon failure of all AC power. The emergency backup lighting

shall also be equipped with an illuminated "Exit" sign mounted above the equipment shelter exit door marking exit locations in the equipment shelter during emergency evacuation.

7. Exterior lighting shall illuminate points-of-exit and entry into the site compound and the equipment shelter and shall be located to the side of the entrance way and above door level.
8. 35-watt high-pressure sodium (HPS) exterior lighting fixtures with cutoff housings that limit the beam top to 35-degrees below horizontal shall be provided and installed with each equipment shelter.
9. A combination photoelectric/motion switch shall be provided and installed that allows for automatic illumination and extinguishment of the exterior equipment shelter lights at twilight and sunrise. The photoelectric/motion switch shall only illuminate the exterior light(s) when motion is detected.
10. A photocell/motion bypass switch shall be installed at the same location as the interior lighting control switches.

M. Heating, Ventilation, and Air Conditioning (HVAC):

1. The Vendor shall provide an HVAC system for each shelter proposed. The Vendor shall propose dual AC units with lead-lag controller. Each AC unit shall be sized for 100% of the building's required cooling capacity, as determined by the BTU analysis. Lead-lag controller shall alternate HVAC system usage or otherwise balance run time between the units.
2. The Selected Vendor shall perform BTU analysis (heat load calculations) for all shelter equipment during preliminary design to verify HVAC system size. All calculations shall include a 50% expansion factor, and all assumptions regarding power consumption, duty factor, and heat loading shall be thoroughly explained.
3. Each unit shall be capable of maintaining an inside ambient temperature range between 65 and 85°F. Each unit shall be sized to maintain temperatures inside the shelter at 70°F with exterior temperatures up to 120°F and full sun exposure.
4. The HVAC system shall be controlled by a wall mounted thermostat. The thermostat shall turn the heater on when the temperature inside the shelter drops to 65°F and off when it rises to 68°F. It shall turn on the air conditioner when the interior temperature reaches 78°F and off when the temperature drops below 75°F. Thermostat control shall be adjustable within the range of 45 to 85°F.

- N. Antenna Cable Conduit Entry -- A bulkhead panel shall be supplied to accommodate coaxial transmission lines between 1/2-inch and 1 5/8-inch diameter elliptical waveguides. A minimum of 12 transmission lines shall be accommodated with 4-inch openings. The building manufacturer shall seal the conduits into the wall to assure that they are watertight.
- O. Cable Tray- All new shelters will be equipped with cable trays. The Selected Vendor or subcontractor shall install a minimum 18-inch wide cable tray system above the equipment.
- P. Shelters shall be supplied with at least one 10 lb CO<sub>2</sub> fire extinguisher, an approved eyewash station, and first aid kit.

#### **4.3 Radio Communications Towers**

- A. General:
  - 1. If Vendor determines that additional radio communications towers are required or that existing towers must be replaced, Vendor shall propose self-supporting towers.
  - 2. Any tower manufacturer supplying a tower(s) for this system shall guarantee structural integrity of the tower for a period of no less than 20-years from the date of acceptance.
- B. Tower materials:
  - 1. All steel materials used in the construction of the tower shall be of galvanized composition, new, and shall conform to the provisions of the TIA/EIA-222-G standard pertaining to physical properties, manufacture, workmanship, and factory finishes for Class-III towers.
- C. Tower heights:
  - 1. The Selected Vendor shall specify tower heights according to their proposed LMR and microwave backhaul network designs.
- D. Tower loading and stresses:
  - 1. The tower and foundation shall be designed for all proposed equipment, legacy equipment, appurtenances, ancillary equipment, initial antenna

loading plus 50% future antenna system growth, without addition to or modification of the finished tower or foundation.

2. Designed loading shall also consider two typical cellular carrier antenna arrays near the top of the structure for future growth or leasing opportunities.
3. Tower designs shall take into account dead and live loads induced by the structure itself, all appurtenances, and all stress applied to the tower and its appurtenances by wind forces. The minimum safety factors listed by TIA/EIA-222-G shall apply under the most severe combination of dead load plus live loading for Class-III towers.

E. Tower appurtenances:

1. The tower shall support all appurtenances. Appurtenances include, but are not limited to; antennas, antenna mounts, antenna platforms, microwave antennas and radomes, lighting, transmission lines, transmission line hangers, cable ladder, climbing ladder and safety device, lightning rods, and conduit.

F. Tower wind loading:

1. Wind loading shall be calculated per TIA/EIA-222-G for Class-III towers with all appurtenances installed plus a 50% margin for future growth.

G. Tower twist, sway, and displacement:

1. The tower shall be designed to meet twist, sway, and displacement specifications for all loading conditions as recommended by TIA/EIA-222-G for Class-III towers for the antennas proposed plus a 50% margin for future growth.

H. Tower hardware:

1. The Selected Vendor shall provide towers with all hardware and accessories required for complete installation meeting all requirements of this specification and in accordance with the Selected Vendor's warranty requirements.

I. Tower cable ladders:

1. Towers shall include transmission line cable ladders capable of supporting the attachment of the transmission lines using stainless steel hangers and adapters of the appropriate size for the transmission lines plus a 50% margin for future growth.
2. The transmission lines shall be supported on the cable ladder at intervals of no more than 3-feet or as recommended by cable manufacturer's specifications.
3. The cable ladder shall be of galvanized steel construction and shall have mounting hardware of stainless steel or galvanized steel construction.

J. Tower electrical grounding:

1. The proposed towers and associated components shall meet or exceed industry best practices for system installation, grounding, bonding, and TVSS.

K. Tower ground rings:

1. The Selected Vendor shall provide and install the tower grounding ring system in accordance with the final approved design.

L. Tower climbing ladders:

1. Towers shall be equipped with an OSHA-approved climbing ladder, an 8-foot lockable fixed ladder guard, and safety climbing cable with belt.
2. Where possible and preferred (as long as a climber is able to cross out and safely service antennas from a reachable distance), the ladder shall be placed inside the tower structure. Step bolts on the outside of the tower structure are not to be the primary climbing device.
3. Tower maintenance climbers shall be able to climb the entire height of the structure without disconnecting from the cable.

M. Tower lighting:

1. Tower lighting shall be supplied as required by the applicable determination as issued by the FAA for this project and fully compliant with FAA AC 70/7460-1K or latest revision.

2. The system control circuitry shall provide synchronization and intensity control of the obstruction lighting system and shall monitor the overall integrity of the lighting system for component failures or improper operation.
3. The Selected Vendor shall wire all alarms to a wall mounted 66 punch-down block (i.e., M-Block or B-Block) located in the communications shelter or equipment room. All alarms shall be clearly labeled.
4. A lightning ground rod shall be installed at the very top of the tower to extend at least two feet above the top of the tower or lighting fixture.
5. Labeling shall be clearly provided near the base of all new towers for the following:
  - a. Make
  - b. Model
  - c. Serial number
  - d. Tower height
  - e. Latitude and longitude
  - f. FAA and FCC identification numbers (if applicable)

N. Tower testing and acceptance:

1. Upon completion of the tower installations, the Selected Vendor shall provide documentation detailing final inspection and testing including the following parameters:
  - a. Steel structure
    - 1) Vertical alignment and plumbness
    - 2) All bolts tight and torqued to specification
    - 3) No damaged or missing structural members
    - 4) All surface scratches and damage to the galvanization shall be repaired
    - 5) No signs of stress or vibration
    - 6) All climbing ladders and other devices installed correctly
    - 7) Labels and tags properly affixed



- b. Tower foundations:
  - 1) Concrete foundations finished with no cracks or blemishes
  - 2) Concrete grouting, if used, shall have drain holes if the tower uses hollow leg construction or monopole design
  - 3) Backfilling and grading
- c. Tower electrical grounding:
  - 1) Lugs and bondings
  - 2) Ground resistance tests
  - 3) Ground lightning rod installed at top of tower
- d. Lighting and controls:
  - 1) Inspected conduit and wiring installation
  - 2) Proper lamp operation
  - 3) Alarm contact operation
  - 4) Labeling
- e. Photographs:
  - 1) Overall structure from North, East, South, and West
  - 2) Footers
  - 3) Electrical grounding

#### ***4.4 Generator and Automatic Transfer Switch (ATS)***

- A. This section provides specifications and requirements for standby power systems to supply electrical power in the event of a failure of normal supply, consisting of a liquid cooled engine, an AC alternator, and system controls with all necessary accessories for a complete operating system, including but not limited to the items as specified.
- B. The Vendor shall provide an emergency generator system at each new radio communications site for backup power.

- C. The Vendor shall perform electrical loading analysis for shelter equipment, including HVAC subsystems, during preliminary design to verify generator size and fuel tank capacity. All electrical loading calculations shall include a 50% expansion factor, and all assumptions regarding power consumption and duty factor shall be thoroughly explained.
1. For the purpose of the proposal, the Vendor shall assume the following:
    - a. 35 kW
    - b. Single phase
    - c. 60 Hz
    - d. 0.8 Power factor
    - e. Natural Gas
    - f. Minimum 72 hour runtime
- D. In the event of a commercial power outage, the emergency generator shall provide power to the entire shelter without system outage.
- E. Quality Assurance - A manufacturer, who has been regularly engaged in the production of engine-alternator sets, automatic transfer switches, and associated controls for a minimum of 10 years, thereby identifying one source of supply and responsibility, shall supply the system.
- F. The generator system and all accessories and ancillary equipment shall comply with the following National Fire Protection Agency (NFPA) and American National Standards Institute (ANSI) standards:
1. NFPA 37 Flammable and Combustible Liquids Code
  2. NFPA 55 Standard for the Storage and Handling of Compressed Gases
  3. NFPA 70 with particular attention to Article 700, Emergency Systems
  4. NFPA 110 Requirements for Level 1 Emergency Power Supply System
  5. NFPA 101 - Code for Safety to Life From Fire in Buildings and Structures
  6. ANSI/NEMA MG 1 - Motor and Generators
  7. ANSI/NEMA AB 1 - Molded Case Circuit Breakers
  8. ANSI/NEMA 250 - Enclosures for Electrical Equipment (1,000 volts maximum)

- G. Labeling and Identification- All wiring harnesses and connectors shall be clearly identified by number and function according to the associated schematic diagrams and documentation provided by the Vendor.
- H. Factory Testing:
1. Before shipment of the equipment, the generator set shall be tested under rated load for performance and proper functioning of control and interfacing circuits. Tests shall include:
    - a. Verification that all safety shutdowns are functioning properly
    - b. Verification of single step load pickup per NFPA 110-1996, Paragraph 5-13.2.6
    - c. Verification of transient and voltage dip responses and steady state voltage and speed (frequency) checks
    - d. Full load test for a minimum of 1 hour
  2. The Selected Vendor or generator/ATS supplier shall provide complete report(s) of all testing performed.
- I. Startup and Checkout:
1. The supplier of the electric generating plant and associated items covered herein shall provide factory trained technicians to check out the completed installation and to perform an initial startup inspection to include:
    - a. Ensuring the engine starts (both hot and cold) within the specified time
    - b. Verifying that engine parameters are within specification
    - c. Verifying that no load frequency and voltage adjusting is required
    - d. Test all automatic shutdowns of the generator
    - e. Performing a simulation of power failure to test that generator start up and automatic transfer switches (ATS) pick up building load correctly
    - f. Returning to commercial power and test generator and ATS to demonstrate correct cycling to normal commercial power

- g. Performing a load test of the generator, to ensure full load frequency and voltage is within specification by using building load. This test shall be run for a minimum of one hour
  - h. Testing and verifying all remote indicators and controls
- 2. The Vendor shall provide complete written report(s) of all testing performed.

#### **4.4.1 Generator, Propane or Natural Gas**

- A. The prime mover shall be a liquid cooled diesel engine of 4-cycle design.
- B. The engine shall have sufficient horsepower rating to drive the generator to full output power without a gearbox between the engine and generator.
- C. The engine shall have a battery charging DC alternator with a solid-state voltage regulator.
- D. The generator shall meet temperature rise standards for Class "H" insulation, operating within Class "F" standards for extended life.
- E. The alternator shall be protected by internal thermal overload protection and an automatic reset field circuit breaker.
- F. One-step load acceptance shall be 100% of generator set nameplate rating and meet the requirements of NFPA 110 paragraph 5-13.2.6.
- G. The electric plant shall be mounted with vibration isolators on a welded steel base that shall permit suitable mounting to any level surface.
- H. A main line output circuit breaker carrying the UL mark shall be factory installed.
  - 1. Form C auxiliary contacts rated at 250 VAC/10 amps shall be provided to allow remote sensing of breaker status.
  - 2. A system utilizing manual reset field circuit breakers and current transformers is unacceptable.
- I. An alternator strip heater shall be installed to prevent moisture condensation from forming on the alternator windings.
- J. Controls:

1. All engine alternator controls and instrumentation shall be designed, built, wired, tested and shock mounted in a NEMA 1 enclosure mounted to the generator set by the manufacturer. It shall contain panel lighting, a fused DC circuit to protect the controls and a +/-5% voltage adjusting control.
2. The generator set shall contain a complete 2-wire automatic engine start-stop control that starts the engine on closing contacts and stops the engine on opening contacts.
3. A programmable cyclic cranking limiter shall be provided to open the starting circuit after four attempts if the engine has not started within that time. Engine control modules must be solid-state plug-in type for high reliability and easy service.
4. The panel shall include:
  - a. Analog meters to monitor:
    - 1) AC voltage
    - 2) AC current
    - 3) AC frequency
  - b. A phase selector switch
  - c. Emergency stop switch
  - d. Audible alarm
  - e. Battery charger fuse
  - f. Programmable engine control
  - g. Monitoring module
5. The programmable module shall include:
  - a. Manual OFF/AUTO switch
  - b. Four LED's to indicate:
    - 1) Not In Auto
    - 2) Alarm Active
    - 3) Generator Running
    - 4) Generator Ready

6. The module shall display all pertinent unit parameters including:
  - a. Generator Status – ON/OFF/AUTO
  - b. Instrumentation - Real-time readouts of the following engine and alternator analog values:
    - 1) Oil pressure
    - 2) Coolant temperature
    - 3) Fuel level (where applicable)
  - c. DC battery voltage
    - 1) Run time hours
    - 2) Alarm Status - Current alarm(s) condition of:
    - 3) High or low AC voltage
    - 4) High or low battery voltage
    - 5) High or low frequency
    - 6) Low or pre-low oil pressure
    - 7) Low water level
    - 8) Low water temperature
    - 9) High and pre-high engine temperature
    - 10) High, low and critical low fuel levels (where applicable)
    - 11) Over crank
    - 12) Over speed
    - 13) Unit not in "Automatic Mode"

K. Unit Accessories:

1. Weather protective enclosure:

- a. The generator set shall be factory enclosed in a heavy gauge steel enclosure constructed with 12 gauge corner posts, uprights and headers.
  - b. The enclosure shall be coated with electro statically applied powder paint, baked, and finished to manufacturer's specifications.
  - c. The enclosure is to have large, hinged doors to allow access to the engine, alternator, and control panel.
2. The exhaust silencer(s) shall be provided of the size recommended by the manufacturer and shall be of critical grade.
3. The generator set shall include an automatic dual rate battery charger manufactured by the generator set supplier. The battery charger is to be factory installed on the generator set. Due to line voltage-drop concerns, a battery charger mounted in the transfer switch will be unacceptable.
4. A heavy duty, lead acid 12 VDC battery shall be provided by the generator set manufacturer. The generator set shall have a frame suitable for mounting the battery and include all connecting battery cables.

#### **4.4.2 Automatic Transfer Switch (ATS)**

- A. The automatic transfer switch shall be compatible with the set to maintain system compatibility and local service responsibility for the complete emergency power system.
- B. Representative production samples of the transfer switch supplied shall have demonstrated through tests the ability to withstand at least 10,000 mechanical operation cycles. One operation cycle is defined as the electrically operated transfer from normal to emergency and back to normal.
- C. Wiring must comply with NEC table 373-6(b). The manufacturer shall furnish schematic and wiring diagrams for the particular automatic transfer switch and a typical wiring diagram for the entire system.
- D. Ratings and Performance:
  1. The ATS shall be adequately sized to match the generator and shelter electrical systems.

2. The ATS shall be a 2-pole design rated for 600 VAC 200 amps continuous operation in ambient temperatures of -20° F (-30° Celsius) to +140° F (+60° Celsius).
3. The operating mechanism will be a single operating coil design, electrically operated and mechanically held in position.
4. A provision will be supplied for manually operating the switch in the event of logic or electrical coil failure.

E. Controls:

1. A solid-state under-voltage sensor shall monitor all phases of the normal source and provide adjustable ranges for field adjustments for specific application needs.
  - a. Pickup and dropout settings shall be adjustable from a minimum of 70% to a maximum of 95% of nominal voltage.
  - b. A utility sensing interface shall be used, stepping down system voltage of 120/240 VAC single-phase to 24 VAC, helping to protect the printed circuit board from voltage spikes and increasing personnel safety when troubleshooting.
2. Controls shall signal the generator set to start in the event of a power interruption.
  - a. A solid-state time delay start, adjustable, from 0.1 to 10 seconds, shall delay this signal to avoid nuisance startups or momentary voltage dips or power outages.
3. Controls shall transfer the load to the generator set after it reaches proper voltage:
  - a. Adjustable from 70-90% of system voltage, and frequency
  - b. Adjustable from 80-90% of system frequency
  - c. A solid-state time delay, adjustable from 5 seconds to 3 minutes, shall delay this transfer to allow the generator to warm up before application of load.
  - d. There shall be a switch to bypass this warm up timer when immediate transfer is required.
4. Controls shall retransfer the load to the line after normal power restoration.



- a. A return to utility timer, adjustable from 1-30 minutes, shall delay this transfer to avoid short-term normal power restoration.
5. The operating power for transfer and retransfer shall be obtained from the source to which the load is being transferred.
6. Controls shall signal the generator to stop after the load retransfers to normal.
  - a. A solid-state engine cool down timer, adjustable from 1-30 minutes, shall permit the engine to run unloaded to cool down before shutdown.
  - b. Should the utility power fail during this time, the switch will immediately transfer back to the generator.
7. The transfer switch shall have a time delay neutral feature to provide a time delay, adjustable from 0.1-10 seconds, during the transfer in either direction, during which time the load is isolated from both power sources. This allows residual voltage components of motors or other inductive loads (such as transformers) to decay before completing the switching cycle.
8. A switch will be provided to bypass all transition features when immediate transfer is required.
9. The transfer switch shall have an in-phase monitor that allows the switch to transfer between live sources if their voltage waveforms become synchronous within 20 electrical degrees within 10 seconds of transfer initiation signal.
  - a. If the in-phase monitor will not allow such a transfer, the control must default to time delay neutral operation.
10. Front mounted controls shall include a selector switch to provide for a NORMAL TEST mode with full use of time delays, FAST TEST mode that bypasses all time delays to allow for testing the entire system in less than one minute, or AUTOMATIC mode to set the system for normal operation.
  - a. The controls shall provide bright lamps to indicate the transfer switch position in either UTILITY (white) or EMERGENCY (red). A third lamp is needed to indicate STANDBY OPERATING (amber). These lights must be energized from utility or the generator set.

- b. The controls shall provide a manually operated handle to allow for manual transfer. This handle must be mounted inside the lockable enclosure and accessible only by authorized personnel.
- c. The controls shall provide a safety disconnect switch to prevent load transfer and automatic engine start while performing maintenance. This switch will also be used for manual transfer switch operation.
- d. The controls shall provide LED status lights to give a visual readout of the operating sequence including:
  - 1) Utility on
  - 2) Engine warm-up
  - 3) Standby ready
  - 4) Transfer to standby
  - 5) In-phase monitor
  - 6) Time delay neutral
  - 7) Return to utility
  - 8) Engine cool down
  - 9) Engine minimum run

#### **4.4.3 Fuel System (Propane or Natural Gas)**

- A. The Vendor shall provide a complete fuel system including tank(s) and all associated piping, valves, controls, etc.
- B. Above-ground tanks shall be bulletproof or protected.
- C. Tank and fuel system components shall be sized to provide a minimum of 72 hours of run time at full load.
- D. Fuel tank(s) shall be located a minimum of 10 feet from the generator and building.
- E. Clear access shall be provided for refueling.
- F. Block walls and/or bollards shall protect above-ground tanks.

G. Tanks:

1. Steel and polyurethane construction
2. UL labeled in accordance with UL 644 and stamped in accordance with American Society of Mechanical Engineers Section VIII, Division 1
3. Rated for a minimum of 250 psig
4. All tanks are to be secured to an adequately sized concrete foundation

H. Fuel System Construction:

1. No copper pipe will be allowed for any part of the underground fuel line system.
2. No bare black iron pipe will be used for any part of fuel system.
3. Any underground steel pipe will be epoxy coated and all joints wrapped to prevent corrosion.
4. All underground pipes will be at least 18 inches below the surface.
5. Fuel lines will be protected with a concrete filled sleeve both entering and leaving the ground for at least 12 inches into the ground and 6 inches above the ground.
6. Fuel lines crossing a driveway will be protected from damage by being installed in a larger pipe sleeve or covered with a concrete barrier of sufficient strength.
7. All above ground pipe will be supported at least every 36 inches.

I. Controls and Monitoring Equipment:

1. Gas capacity gage with low fuel level alarm contact closure
2. Multi-valve for filling, pressure relief and gauging

#### **4.5 Uninterruptable Power Supply (UPS)**

- A. The Selected Vendor shall provide a single phase, online, double conversion, static type, uninterruptible power supply (UPS) at each shelter with the following features:
1. Surge suppression
  2. Input harmonics reduction

3. Rectifier / charger
  4. Inverter
  5. Static bypass transfer switch
  6. Battery and battery disconnect device
  7. Internal maintenance bypass / isolation switch
  8. Output isolation transformer
  9. Remote UPS monitoring provisions
  10. Battery monitoring
  11. Remote monitoring
- B. The Selected Vendor shall perform electrical loading analysis for shelter equipment, excluding HVAC subsystems, during preliminary design to verify UPS size required. All electrical loading calculations shall include a 50% expansion factor, and all assumptions regarding power consumption and duty factor shall be thoroughly explained.
- C. For the purpose of the proposal, the Selected Vendor shall assume the following:
1. 10 kVA output
  2. Single phase
  3. 60 Hz
  4. 0.8 Power Factor
  5. Minimum two hour runtime
- D. Quality Assurance:
1. Electrical components, devices, and accessories shall be listed and labeled as defined in NFPA 70, by a qualified testing agency and marked for intended location and application.
  2. UL compliance shall be listed and labeled under UL 1778 by a Nationally Recognized Testing Laboratory (NRTL).
  3. NFPA Compliance shall identify UPS components as suitable for installation in computer rooms according to NFPA 75.
- E. Operational Requirements:

1. Automatic operation includes the following:
  - a. Normal Conditions – Load is supplied with power flowing from the normal power input terminals, through the rectifier-charger and inverter, with the battery connected in parallel with the rectifier-charger output.
  - b. Abnormal Supply Conditions – If normal supply deviates from specified and adjustable voltage, voltage waveform, or frequency limits, the battery supplies energy to maintain constant, regulated current.
  - c. If normal power fails, energy supplied by the battery through the inverter continues supply-regulated power to the load without switching or disturbance.
  - d. When power is restored at the normal supply terminals of the system, controls automatically synchronize the inverter with the external source before transferring the load. The rectifier-charger then supplies power to the load through the inverter and simultaneously recharges the battery.
  - e. If the battery becomes discharged and normal supply is available, the rectifier-charger charges the battery. On reaching full charge, the rectifier-charger automatically shifts to float-charge mode.
  - f. If any element of the UPS system fails and power is available at the normal supply terminals of the system, the static bypass transfer switch switches the load to the normal AC supply circuit without disturbance or interruption.
  - g. If a fault occurs in the system supplied by the UPS, and current flows in excess of the overload rating of the UPS system, the static bypass transfer switch operates to bypass the fault current to the normal AC supply circuit for fault clearing.
  - h. When the fault has cleared, the static bypass transfer switch returns the load to the UPS system.
  - i. If the battery is disconnected, the UPS continues to supply power to the load with no degradation of its regulation of voltage and frequency of the output bus.

2. Manual operation includes the following:
  - a. Turning the inverter off causes the static bypass transfer switch to transfer the load directly to the normal AC supply circuit without disturbance or interruption
  - b. Turning the inverter on causes the static bypass transfer switch to transfer the load to the inverter
3. Controls and indications: Basic system controls shall be accessible on a common control panel on the front of the UPS enclosure.

F. Performance Requirements:

1. Input:
  - a. Single phase, three-wire
  - b. Voltage: 120/240V Nominal
  - c. Frequency: 50/60 Hz +/- 3 Hz
2. Output:
  - a. Capacity: to be determined by Vendor during preliminary design
  - b. Voltage: 120/240V
  - c. Frequency: 60 Hz, +/- 3 Hz
  - d. Maximum Voltage Distortion: 5% at full load
3. Minimum Duration of Supply – If the battery is the sole energy source supplying rated full UPS load current at 80 percent power factor, duration of the supply is 30 minutes.
4. Minimum Overload Capacity of UPS at Rated Voltage – 125 percent of rated full load for 10 minutes, and 150 percent for 30 seconds in all operating modes.
5. EMI Emissions -- Comply with FCC Rules and Regulations and with 47 CFR 15 for Class A equipment.
6. Electronic Equipment -- Solid-state devices using hermetically sealed, semiconductor elements. Devices include rectifier-charger, inverter, and system controls.

7. Surge Suppression -- Protect internal UPS components from surges that enter at each AC power input connection and protect rectifier-charger, inverter, controls, and output components.
  - a. Use factory-installed surge suppressors tested according to IEEE C62.41.1 and IEEE C62.41.2.
  - b. Additional Surge Protection -- Protect internal UPS components from low-frequency, high-energy voltage surges described in IEEE C62.41.1 and IEEE C62.41.2. Circuits connecting with external power sources and select circuit elements, conductors, conventional surge suppressors, and rectifier components and controls shall be designed so input assemblies will have adequate mechanical strength, and thermal and current-carrying capacity to withstand stresses imposed by 40 Hz, 180 percent voltage surges described in IEEE C62.41.1 and IEEE C62.41.2.
8. Rectifier-Charger:
  - a. Capacity -- Adequate to supply the inverter during rated full output load conditions and simultaneously recharge the battery from fully discharged condition to 95 percent of full charge within 10 times the rated discharge time for the duration of the supply under battery power at full load
  - b. Output Ripple -- Limited by output filtration to less than 0.5 percent of rated current, peak-to-peak
  - c. Battery Float-Charging Conditions -- Comply with battery manufacturer's written instructions for battery terminal voltage and charging current required for maximum battery life
9. Inverter – Pulse-width modulated, with sinusoidal output

G. Tests and Inspections:

1. Comply with manufacturer's written instructions
2. Inspect interiors of enclosures, including the following:
  - a. Integrity of mechanical and electrical connections
  - b. Component type and labeling verification
  - c. Ratings of installed components

3. Test manual and automatic operational features and system protective and alarm functions.
  4. Load the system using a variable-load bank to simulate kilovolt amperes, kilowatts, and power factor of loads for the unit's rating.
    - a. Simulate malfunctions to verify protective device operation
    - b. Test the duration of supply on emergency, low-battery voltage shutdown, and transfers and restoration due to normal source failure.
    - c. Test harmonic content of input and output current less than 25, 50, and 100% of rated loads.
    - d. Test output voltage under specified transient-load conditions.
    - e. Test efficiency at 50, 75, and 100% of rated loads.
  5. Provide inspection reports.
- H. Demonstration: Train the County's maintenance personnel to adjust, operate, and maintain the UPS.



## **5. Warranty, Maintenance, and Support**

### **5.1 Warranty**

- A. The proposed communications system shall have a warranty period of not less than 3 years. The warranty period shall commence upon Final Acceptance.
- B. The Selected Vendor shall provide a single toll-free telephone number that answers 24 hours a day, 7 days a week, 365 days a year, for service requests and warranty claims.
- C. Vendors shall state in their proposal the name, address, and capabilities of the service station(s) providing warranty service.
- D. The Selected Vendor shall adhere to the following procedures during the warranty period:
  - 1. Warranty Maintenance shall be performed 24 hours a day, 7 days a week at no additional charge for work outside of normal Vendor business hours.
  - 2. The service facility shall provide prompt repair service, with service personnel arriving onsite within two hours after a service request by the County and returning the system to service within four hours after a service request notification by the County.
  - 3. The County shall be provided with written documentation indicating the cause of the service outage, the resolution, and all post-repair testing procedures to ensure proper operation. In the event the County owned spares are used to complete a repair, the model and serial number of both the defective unit and the spare shall be noted in the documentation.
  - 4. For all equipment needing factory or depot repairs, a comprehensive tracking system shall be put in place by the Selected Vendor to track units to and from the factory/depot.

### **5.2 Maintenance**

- A. The Selected Vendor shall maintain and repair all systems, equipment, hardware, and software throughout the implementation / migration and warranty periods. The County requires its own technical staff onsite to witness, and if desired, assist in maintenance and troubleshooting procedures. This does not relieve the Vendor from warranty and maintenance responsibility as defined in this specification.

- B. The Selected Vendor shall maintain all systems, subsystems, and equipment at the then current level and revision of software and firmware throughout the implementation / migration and warranty periods. The Selected Vendor shall certify that all systems, subsystems and equipment are loaded and running the latest released version of all software and firmware at the time of system acceptance and at the time of warranty expiration.
- C. The Vendor shall identify its plan to provide upgrades to firmware and software to keep revisions current.

### **5.2.1 General**

- A. Comprehensive maintenance services shall be proposed for each system.
- B. The Vendor shall provide a list of maintenance plans available. Plans should be based on the quantities of equipment included in the proposed system. Plans should have options for annual services post warranty. These plans shall include:
  - 1. Fixed equipment onsite service:
    - a. 2-hour response time
    - b. 4-hour response time
    - c. 8-hour response time
    - d. Next day response time
    - e. Full time onsite technician
  - 2. Fixed equipment mail-in board repair:
    - a. Normal response - 7-day
    - b. Emergency response - Next day
  - 3. All fixed equipment maintenance plans shall provide 24-hour system support where users can dial one toll-free number to report problems and/or receive technical support.
  - 4. Additionally, for fixed onsite maintenance, the Vendor's staff will then dispatch the proper technician in the prescribed response time to resolve the problem, if the Vendor is unable to resolve the problem through telephone consultation.

5. The Vendor shall identify in the proposal any third party repair service to be used and provide its qualifications, contact information, and experience in North Carolina with similar conventional radio systems.

### **5.2.2 Maintenance Standards**

- A. Replacement parts used in repairs shall be equal in quality and ratings as the original parts.
- B. Equipment shall be maintained in a clean condition. Oil, dust and other foreign substances shall be removed during servicing.
- C. Equipment and system performance shall be maintained at the level initially described in this specification. The Vendor's service organization shall maintain records to confirm this has been done at intervals defined by the County.
- D. The Selected Vendor shall provide only factory trained and authorized maintenance personnel.
- E. If fixed equipment or a fixed equipment module fails more than twice during the final acceptance test or twice during the first year, the Vendor shall meet with the County to discuss and explain such failures. If, in the opinion of the County, these failures indicate that the equipment is prone to continuing failures, the Selected Vendor shall replace it and all other units/modules/parts of the same type and version, at no cost to the County.

### **5.3 Parts Availability**

- A. From the date of final acceptance to the seventh anniversary of the date of final acceptance, the Selected Vendor shall maintain replacement parts for all delivered equipment.
- B. In the event the Selected Vendor plans to discontinue stocking any part required for maintenance after the seventh anniversary of final acceptance, the Selected Vendor shall send written notice to the County 24 months prior to the date of discontinuance to allow for last-time buys and replenishment.
- C. All parts, ordered on a priority basis, shall be delivered within 24 hours after placing an order. The Selected Vendor shall provide year around, 24 hour ordering facilities via telephone, Internet, e-mail, and fax service.

## **5.4 Spare Equipment**

- A. Vendors shall propose to the County as an OPTION, recommended spare parts for the system, subsystems, and individual equipment and subscribers. The cost of this OPTION shall be detailed at the unit or part level.
- B. The list of spare parts shall include, but is not limited to:
  - 1. Any vendor identified Field Replaceable Units (FRUs)
  - 2. Any infrastructure component, which does not have FRUs that can cause a critical failure if it were to fail
  - 3. Power supplies
  - 4. Test measurement, calibration and repair kits
  - 5. Diagnostic equipment to support the County maintenance activities
  - 6. Spares for less critical items shall also be enumerated
- C. The list shall include items that will rapidly and completely restore all critical system functionality with the least amount of effort, e.g., board replacement instead of troubleshooting to component level when a critical unit has failed.
- D. The quantities of spares in the list shall be appropriately sized to accommodate equipment quantities in the system. The County typically adheres to a preference of **10%** minimum spares count for infrastructure components.
- E. The list shall define the primary equipment category each spare kit supports, e.g., transceiver board for a repeater, interface board for a console, etc.
- F. The system engineering design documentation shall include a narrative on the Vendor's ability to replace failed units from stock and the process and timing to repair, replace, and return failed units delivered for repair, expressed as MTTR (Mean Time To Repair).
- G. System engineering design documentation shall also include the life cycle of equipment, parts, and other maintenance support for the system.

## **5.5 Post-Warranty Maintenance**

- A. As an OPTION, Vendors shall propose maintenance services for subsequent years, renewable on an annual basis.

- B. This OPTION shall include all hardware, firmware, and software maintenance. All hardware, firmware, and software upgrade services to maintain the system and all equipment at the then current revision level shall be provided with detailed costs.
- C. The Vendor shall fully describe the terms and conditions of the maintenance services in the Proposal.
- D. The Vendor shall indicate who the local authorized repair facility will be for post warranty repairs upon completion of the Detailed Design Review process.

## **6. System Implementation, Test, and Acceptance**

### **6.1 General**

- A. The Selected Vendor shall attend monthly project and construction meetings as deemed necessary by the County prior to and during installation. Additional meetings may be scheduled at the discretion of the County.
- B. If any changes in the overall timeline occur, the Vendor shall update the project schedule for discussion during these project meetings.
- C. The Selected Vendor shall provide written minutes of all meetings no later than five business days after the meeting.

### **6.2 Cutover Plan**

- A. The Selected Vendor shall be responsible for planning and coordinating the implementation of all equipment, subsystems, and the overall system.
- B. Execution of the cutover plan shall ensure that new systems are brought online with minimum interruption to all existing systems and communications.
- C. During final design, the Selected Vendor shall deliver a preliminary cutover plan describing how the radio system will be phased over into a fully operational system.
  - 1. The Selected Vendor shall successfully complete all tests and training prior to the actual cutover of systems.
  - 2. The Selected Vendor shall provide the necessary labor to cutover from existing systems to the proposed system.
  - 3. The plan shall include the schedule and procedures associated with the transition of each operational user group. The plan shall specifically address how the existing users will begin using the new system with minimal operational impact.
  - 4. The plan shall provide detailed component or subsystem cutover plans, and specifically delineate between systems that affect and do not affect ongoing operations.
  - 5. The County reserves the right to approve and change the cutover plan as it relates to any or all system components.

### **6.3 Systems Staging**

- A. Each individual assembly or equipment unit shall undergo factory testing prior to shipment.
- B. Standard factory test documentation, documenting the tests performed and indicating successful completion of testing shall be submitted to the County.
- C. System Staging:
  - 1. The complete system shall be staged and tested in the United States. The intent of the staging tests is to demonstrate to the County that the system is ready for shipment and installation.
  - 2. The Staging Acceptance Test Plan, documenting tests to be performed during staging, shall be approved by the County prior to system staging.
  - 3. The Selected Vendor shall provide all necessary technical personnel, and test equipment to conduct staging tests. All deviations, anomalies, and test failures shall be resolved at the Vendor's expense.
  - 4. The Selected Vendor shall use an approved Staging Acceptance Test Plan (SATP). It is expected that the SATP has been performed and all tests have been successful before the County witnesses the official SATP. The SATP shall be signed and dated by the Vendor and the County representatives following completion of all tests. All tests in the SATP shall be marked as either pass, fail, or pass qualify.
  - 5. Failed tests shall be documented, corrected, and retested. All defective components shall be replaced and retested. Defective components that cannot be corrected shall be replaced at the expense of the Vendor. All tests where the results may be affected by these corrective actions shall be repeated.
  - 6. Retest of individual failed SATP tests or the entire plan shall be at the County's discretion.
  - 7. The fully executed, completed, and signed SATP document shall be provided to the County.

### **6.4 System Installation**

- A. Installation shall consist of a complete tested system to include placement of associated cabling, appropriate system layout, and terminal connections. The

Selected Vendor shall provide associated power supplies and any other hardware, adapters and or connections to deliver a complete operable system to the County at the time of field acceptance.

- B. All installations shall be performed by factory authorized or Selected Vendor affiliated service shops. Other shops or installers may be used upon mutual agreement between the County and the Selected Vendor. Qualified, adequately trained personnel familiar with this type of work shall perform all installations. The Selected Vendor shall provide the names of the service shops, a summary of their experience, and a list of five references (minimum) for each proposed shop.
- C. Prior to the start of the system installation, the Selected Vendor shall participate in a mandatory project site survey with the County's representative to confirm actual equipment location within each space. At that time, the exact equipment locations that differ from installation drawings will be determined and documented by the Selected Vendor.
- D. The Selected Vendor shall coordinate with the County and others, as appropriate, to confirm that any prep work that affects the installation of the base station equipment, such as tower work, coring, bracing, conduit, electrical, etc., is complete before final inspection and field acceptance.
- E. The Selected Vendor shall provide and pay for all materials necessary for the execution and completion of all work. Unless otherwise specified, all materials incorporated into the permanent work shall be new and shall meet the requirements of this specification. All materials furnished and work completed shall be subject to inspection by a County authorized representative or the County's System Engineer.
- F. Equipment supplied as spare equipment may not be used for installation of the proposed system. All spare equipment must be supplied in an unused condition.
- G. All equipment and devices shall be cleaned internally and externally, and all damaged finishes shall be repaired.
- H. Worksites shall be left neat and broom swept upon completion of work each day. All shelter floors will be thoroughly cleaned and all scuff marks and abrasions will be removed prior to final field acceptance. All trash shall be removed weekly.



I. Inspection:

1. The County shall conduct an inspection of each installation upon substantial completion with the Selected Vendor's Project Manager. Any deficiencies shall be documented on a single punch list and provided to the Selected Vendor for resolution.
2. Final field acceptance testing shall not commence until all punch list items are resolved.

## **6.5 Coverage Testing**

A. The Vendor shall submit a preliminary Coverage Acceptance Test Plan (CATP) with the Proposal. The final CATP shall be submitted during the Final Design stage of the project.

B. CATP:

1. The CATP shall be consistent with the procedures and guidelines outlined in TSB-88C latest revision.
2. Coverage testing shall commence only after the radio system is fully tested and aligned. Significant changes to the system will require retesting of coverage at the discretion of the County.
3. The Selected Vendor shall perform two types of coverage testing:
  - a. Automated objective mobile drive testing
  - b. Non-automated subjective DAQ testing (intelligibility testing)

Automated and intelligibility testing shall be complementary and serve to fully verify that coverage requirements are met both technically and operationally.

4. Test Configurations:
  - a. Testing configurations for automated and intelligibility testing shall represent typical operating configurations to the greatest extent possible, using portable and mobile radio equipment to be used with the system.
  - b. Radio equipment used for coverage testing shall operate within nominal tolerance of published specifications.
    - 1) Transmitter power shall be +0.25 dB, – 1.0 dB

- 2) Receive sensitivity shall be + 3 dB, - 1.0 dB
- c. Automated Objective Mobile Drive Testing:
  - 1) The Selected Vendor shall test the signal level at a statistically significant number of test locations throughout the County service area utilizing automated test equipment such as Survey Technologies Inc. STI-9400 series test equipment or equivalent.
  - 1) Inaccessible grids shall not count as either a pass or fail in the statistical analysis.
- d. Non-Automated Subjective DAQ Testing:
  - 1) The Selected Vendor shall perform non-automated subjective DAQ coverage testing using portable radios typical of the system.
  - 2) The Selected Vendor shall document talk-out and talk-in performance.
  - 3) The Selected Vendor shall provide a standardized test form for testing
- e. The Selected Vendor shall coordinate with the County to establish pass/fail criteria as well as correlation between the subjective and objective test results.

## **6.6 30-Day Operational Test**

- A. The Selected Vendor shall perform a 30 calendar day operational test of the system to ensure that all hardware and software defects have been corrected prior to entering final proof of performance testing. The full-integrated operation of the system, including all individual subsystems, shall be demonstrated during these tests. The tests shall be designed to demonstrate the reliability, long-term stability, and maintainability of the systems. A failure of any component of the system during this test will cause the test to reset and restart from the beginning after the repair is completed. The Selected Vendor and the County will agree on what constitutes a critical failure prior to commencing this test.
- B. The Selected Vendor shall provide a 30-day operational test plan during the preliminary design phase.

## **6.7 Final Acceptance Testing**

- A. Prior to Final Acceptance Testing, the Selected Vendor shall verify and document that all equipment (including subscriber units), hardware, and software are upgraded to the then latest factory revision. Multiple revision levels among the same equipment types/models are not acceptable. The County shall be given two weeks written notice that the system is ready for final acceptance testing. The Final Acceptance Test Plan shall test all items described in the detailed design documents.
- B. Final Acceptance Test Plan (FATP):
  - 1. The Selected Vendor shall use the completed and County approved Final Acceptance Test Plan (FATP). It is expected that the FATP has been performed and all tests have been successful before the County witnesses the official FATP. The FATP shall be signed and dated by the Selected Vendor and the County representatives following completion of all tests. All tests in the FATP shall be marked as either pass, fail, or pass qualify.
  - 2. The Selected Vendor shall provide all necessary technical personnel and test equipment to conduct FATP tests. All deviations, anomalies, and test failures shall be resolved at the Vendor's expense.
  - 3. Failed tests shall be documented, corrected, and retested. All defective components shall be corrected and retested. Defective components that cannot be corrected shall be replaced at the expense of the Vendor. All tests where the results may be affected by these corrective actions shall be repeated.
  - 4. Retest of individual failed FATP tests or the entire plan shall be at the discretion of the County.
  - 5. The fully executed and completed FATP document shall be provided to the County.

## **6.8 As-Built Documentation**

- A. Final "As-built" documentation shall be provided in electronic form, AutoCAD® and Adobe Portable Document Format (PDF), as well as five bound hard copy sets. At the completion of the installation phase, the Selected Vendor shall provide complete as-built documentation as outlined below:
  - 1. Equipment provided

2. Plan and elevation drawings of all equipment including antennas on towers
3. Cabling and terminations
4. Block and level diagrams
5. Fleet mapping and programming
6. Setup, configuration, and alignment information
7. Successfully completed, signed, and dated Acceptance Test Plans

## **6.9 System Acceptance**

The County shall deem the system ready for final acceptance following successful completion and approval of the following:

- A. Final Design submittals
- B. Staging Acceptance Test Plan (SATP)
- C. System installation
- D. Final inspection and punch list resolution
- E. As-built documentation
- F. Final Acceptance Test Plan (FATP), including Coverage Acceptance Test Plan (CATP)
- G. 30 day operational test completion
- H. Training

System acceptance shall not occur based on any other factor, including the assertion of beneficial use.

## **Appendix A – Sample Purchase Contract**

### **YADKIN COUNTY**

### **AGREEMENT FOR SERVICES**

### **NORTH CAROLINA**

This Agreement is made and entered into this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_ (“Effective Date”) between Yadkin County, North Carolina (“County”) and \_\_\_\_\_ (“Provider”).

WHEREAS, the County and the Provider wish to enter into a contract under which the Provider will provide certain specified services and/or materials to the County in exchange for payment. NOW, THEREFORE, in consideration of the mutual covenants, promises, terms, conditions, and agreements herein, the County and the Provider agree as follows:

1. Services to Be Performed. The Provider agrees to perform the services and to provide the materials (all collectively called the “Services”) for the County as described in Section A of the attached Exhibit A (the “Contract Specifications”), which is incorporated into this Agreement by reference as if it were fully set forth herein. The Provider warrants that all materials it provides shall be of good quality and shall meet industry standards and the County’s expectations and approval, and the Provider warrants that it shall perform all Services in a good and workman like manner, in accordance with industry standards and the County’s expectations, and to the County’s full satisfaction.

2. Term. The term of this Agreement shall be as provided in Section B of the attached Exhibit A, the Contract Specifications.

3. Payment. In accordance with Section C of the attached Exhibit A, the Contract Specifications, the County agrees to pay the Provider for Services satisfactorily performed in accordance with this Agreement. The County shall pay each properly submitted invoice within thirty (30) days of its submission. Each invoice shall document, to the County’s satisfaction, the work performed and the basis for the amount of payment sought. If the Provider fails to perform in accordance with this Agreement, the County may, without penalty, withhold any payment(s) associated with Services not properly performed until and unless the Provider completes or corrects its performance, as applicable. The County’s remedies under this Agreement are not exclusive and are in addition to all other rights and remedies provided by law.

4. Non-waiver. If the County at any time does not require the Provider to satisfy any of the Provider’s obligations under this Agreement, or if the County fails at any time to exercise any right or privilege granted to it by this Agreement, that shall not waive or limit the County’s ability to require the Provider to satisfy those obligations in the future or the County’s ability to enforce its rights or privileges in the future. If the County waives any breach of this Agreement



by the Provider, that shall not be deemed a waiver of any later breach by the Provider, nor shall it be deemed a waiver of this section of the Agreement.

5. Independent Contractor. For purposes of this Agreement, the Provider at all times shall be considered an independent contractor, and the County shall not be deemed the employer of the Provider or of any of the Provider's agents or employees, nor shall the County be responsible for the actions or omissions of the Provider or its agents and employees. For purposes of this Agreement, the Provider and its agents and employees shall not be deemed an employee of the County for any purpose, including (by example only and not for purposes of limitation) federal or state income taxation, unemployment benefits, or worker's compensation benefits.

6. Insurance. For the term of this Agreement, the Provider shall maintain at its sole expense the insurance specified in Section D of the attached Exhibit A, the Contract Specifications. All insurance policies shall be issued by a company authorized to issue insurance in the State of North Carolina. Before beginning to perform under this Agreement, the Provider shall provide the County with a certificate of insurance showing that all insurance required by this Agreement is in effect, and the Provider shall keep that certificate current by submitting to the County updated certificates as the Provider's insurance policies are renewed or otherwise modified. The Provider shall notify the County immediately if any insurance required by this Agreement will be or has been cancelled or not renewed or if the amount of coverage of any such insurance will be or has been reduced.

7. Indemnity. The Provider agrees that it shall defend, indemnify, and hold harmless the County and its officials, employees, and agents from and against any and all losses, liabilities, claims, demands, suits, costs, damages, or expenses (including reasonable attorneys' fees) arising from or related to this Agreement and/or the Services, including (by example only and not for purposes of limitation) those for bodily injury, death, or property damage. The Provider's obligations under this section shall survive termination of this Agreement.

8. Termination. Notwithstanding any other provision of this Agreement (including any provision in the attached Exhibit A), this Agreement may be terminated at any time by mutual written agreement of the County and the Provider, or it may be terminated by the County upon ten (10) days' written notice to the Provider. Ten days' written notice for termination by the County is not required if the County is terminating because the Provider has breached the Agreement.

9. Entire Agreement. This Agreement (including the attached Exhibit A, the Contract Specifications) constitutes the complete and entire Agreement between the County and the Provider concerning the subject matter of the Agreement and supersedes any and all prior agreements, discussions, understandings, promises, or representations concerning that subject matter. This Agreement may be modified only by a writing signed by both the County and the Provider.

10. Governing Law and Forum for Disputes. This Agreement shall be governed by the laws of the State of North Carolina without regard to North Carolina's choice of law

provisions. Any lawsuit or other legal proceeding concerning this Agreement and/or the Services must be filed in Yadkin County, North Carolina, unless it is properly filed in federal court, in which case it must be filed in the federal District Court for the Middle District of North Carolina.

11. Severance Clause. If any part of this Agreement is deemed unenforceable by a court of competent jurisdiction, then that part shall be enforced to the greatest extent legally possible, and the rest of this Agreement will remain in full force and effect.

12. Compliance With Laws. The Provider acknowledges and agrees that it will perform all Services and will satisfy all of its obligations under this Agreement in full compliance with all applicable federal, state, and local laws and regulations.

13. Repair of Damages. The Provider shall promptly and fully repair any damages that it or its employees or agents cause to the County's property. Alternatively, the County may choose in its discretion to require the Provider to fully compensate the County for any such damages rather than have the Provider repair them.

14. Titles and Headings. Titles and headings used in this Agreement are for convenience only and do not limit or modify the language within each section of this Agreement.

15. Non-Assignment. The Provider may not assign its rights or obligations under this Agreement, nor may it subcontract any part of this Agreement, without written approval from the County.

16. Notices. Any notice or communication to the County or the Provider for purposes of this Agreement shall be delivered or shall be deposited in the United States Mail, first class, addressed to the addressee in Section E of the attached Exhibit A, the Contract Specifications.

17. Number and Gender. This Agreement's use of singular, plural, masculine, feminine, and neuter pronouns shall include the others as the context may require.

18. Exhibit A. To the extent of a conflict between the above language of this Agreement and the attached Exhibit A (the Contract Specifications), the above language of this Agreement will control.

IN WITNESS WHEREOF, the County and the Provider have caused this Agreement to be executed as of the Effective Date.

THE COUNTY

THE PROVIDER

BY: \_\_\_\_\_

BY: \_\_\_\_\_

Name: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Title: \_\_\_\_\_

**EXHIBIT A**

**CONTRACT SPECIFICATIONS**

A. Services to Be Performed By The Provider. (The Services may also be described on one or more attached sheets, but each must be signed by the Provider and the County.)

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B. Term of the Agreement. (Check the one provision that applies.)

\_\_\_\_\_ This Agreement shall end on \_\_\_\_\_, 20\_\_\_\_\_.

\_\_\_\_\_ This Agreement shall continue until the Provider has completed the Services to the County's satisfaction.

\_\_\_\_\_ This Agreement shall continue until terminated in accordance with Section 8 of the Agreement.

C. Payment to the Provider. (Check the provision that applies.)

\_\_\_\_\_ The County shall pay the Provider \$\_\_\_\_\_ every \_\_\_\_\_.

\_\_\_\_\_ The County shall pay the Provider a total of \$\_\_\_\_\_ for all Services performed under this Agreement. The Provider will invoice the County for Services as they are performed, but no more frequently than monthly.





- D. Insurance. During this Agreement's term, the Provider shall maintain worker's compensation insurance as required by North Carolina law to cover all of the Provider's employees engaged in any work under the Agreement. The Provider shall also maintain the following insurance to cover its performance under this Agreement during the Agreement's term (check all that apply):

\_\_\_\_\_ General commercial liability in the amount of \_\_\_\_\_.

\_\_\_\_\_ Automobile liability covering all owned, hired, and non-owned vehicles used in connection with this Agreement. The minimum combined single limit shall be \_\_\_\_\_ for bodily injury and property damage; \_\_\_\_\_ uninsured/underinsured motorist coverage; and \_\_\_\_\_ medical payment.

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- E. Contact Information.

THE COUNTY

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THE PROVIDER

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**Yadkin County RFP for Yadkin Co. Radio System**

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These Contract Specifications are hereby acknowledged and agreed to by:

THE COUNTY

THE PROVIDER

BY: \_\_\_\_\_

BY: \_\_\_\_\_

Name: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Title: \_\_\_\_\_





# CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

**IMPORTANT:** If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME:	
	PHONE (A/C, No, Ext):	FAX (A/C, No):
	E-MAIL ADDRESS:	
	INSURER(S) AFFORDING COVERAGE	
	NAIC #	
	INSURER A:	
INSURED	INSURER B:	
	INSURER C:	
	INSURER D:	
	INSURER E:	
	INSURER F:	

## COVERAGES

CERTIFICATE NUMBER:

REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADOC SUBR INSR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
	GENERAL LIABILITY					EACH OCCURRENCE \$
	<input type="checkbox"/> COMMERCIAL GENERAL LIABILITY					DAMAGE TO RENTED PREMISES (Ea occurrence) \$
	<input type="checkbox"/> CLAIMS-MADE <input type="checkbox"/> OCCUR					MED EXP (Any one person) \$
						PERSONAL & ADV INJURY \$
						GENERAL AGGREGATE \$
	GEN'L AGGREGATE LIMIT APPLIES PER:					PRODUCTS - COMPROP AGG \$
	<input type="checkbox"/> POLICY <input type="checkbox"/> PROJECT <input type="checkbox"/> LOC					\$
	AUTOMOBILE LIABILITY					COMBINED SINGLE LIMIT (Ea accident) \$
	<input type="checkbox"/> ANY AUTO					BODILY INJURY (Per person) \$
	<input type="checkbox"/> ALL OWNED AUTOS <input type="checkbox"/> SCHEDULED AUTOS					BODILY INJURY (Per accident) \$
	<input type="checkbox"/> HIRED AUTOS <input type="checkbox"/> NON-OWNED AUTOS					PROPERTY DAMAGE (Per accident) \$
						\$
	UMBRELLA LIAB					EACH OCCURRENCE \$
	<input type="checkbox"/> EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE					AGGREGATE \$
	<input type="checkbox"/> DED <input type="checkbox"/> RETENTION \$					\$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY					WC STATUTORY LIMITS <input type="checkbox"/> OTHER <input type="checkbox"/>
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH)	Y/N <input type="checkbox"/>	N/A			E.L. EACH ACCIDENT \$
	If yes, describe under DESCRIPTION OF OPERATIONS below					E.L. DISEASE - EA EMPLOYEE \$
						E.L. DISEASE - POLICY LIMIT \$

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

## CERTIFICATE HOLDER

## CANCELLATION

	<p>SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.</p>
	<p>AUTHORIZED REPRESENTATIVE</p>

ACORD 25 (2010/05)

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## Appendix B – Yadkin County, NC, Licensed Frequencies

FIRE / EMS/ RESCUE						
NAME	RX FREQ	RX "PL"	TX FREQ	TX "PL"	RADIO DISPLAY	DESCRIPTION / USE
FIRE F-1	154.040	85.4	154.950	85.4	YADKIN F-1	FIRE/EMS/RESCUE DISPATCH
FIRE F-2	153.935	103.5	153.935	103.5	YADKIN F-2	FIREGROUND
FIRE F-3	154.785	85.4	155.970	85.4	YADKIN F-3	FIRE MUTUAL AID
ST FIRE F-4	154.280		154.280	85.4	ST FIRE F-4	STATE FIRE / HELO OPS / FIREGROUND
FIRE F-5	154.040	85.4	154.040	85.4	YADKIN F-5	FIRE F-1 TALK AROUND
FIRE F-6	154.740	85.4	154.740	85.4	YADKIN F-6	FIREGROUND
FIRE F-7	155.970	103.5	155.970	103.5	YADKIN F-7	FIREGROUND
ST RESCUE F-8	155.280		155.280	85.4	ST RESQ F-8	STATE RESCUE
FIRE F-9	155.535	85.4	155.535	85.4	YADKIN F-9	FIREGROUND



**Yadkin County RFP for Yadkin Co. Radio System**

<b>LAW ENFORCEMENT</b>						
<b>NAME</b>	<b>RX FREQ</b>	<b>RX "PL"</b>	<b>TX FREQ</b>	<b>TX "PL"</b>	<b>RADIO DISPLAY</b>	<b>DESCRIPTION / USE</b>
SHERIFF F-1	155.385	107.2	159.405	107.2	YCSO F-1	Countywide Law Enforcement Dispatch
SHERIFF F-2	154.875	151.4	154.875	151.4	YCSO F-2	Northwest NC Law Enforcement Mutual Aid
SHERIFF F-3	155.475		155.475	151.4	NLEEC F-3	National Law Enforcement Emergency Channel
SHERIFF F-4		151.4		151.4	SERT F-4	SERT Tactical Operations
SHERIFF F-5	155.535		155.535		YCSO F-5	Countywide Car to Car
SHERIFF F-6	154.6	151.4	154.6	151.4	JAIL/COURT	Courtroom and Jail Operations
SHERIFF F-7	155.775	103.5	153.74	103.5	YCSO BKUP	Backup Repeater (Shared with Animal Control)
ANIMAL CONTROL	155.775	85.4	153.74	85.4	YCAC F-1	Yadkin Co. Animal Control

